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Skeptical Inquirer

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Volume 21, No. 3 • May/June 1997

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The Real Asteroid Threat
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A Skeptic's Guide to Collective Delusions
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A High School English Course Takes Some Lessons from Science
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More Sagan Tributes

Published by the Committee for the Scientific Investigation of Claims of the Paranormal

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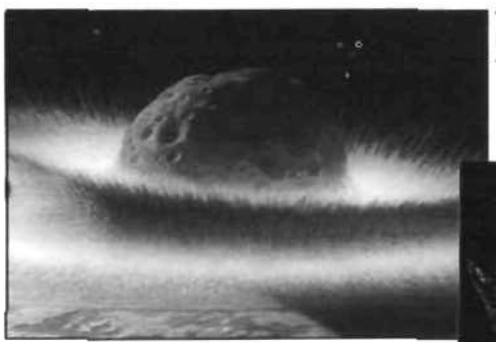

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On the Cover: A giant asteroid approaches Earth in the NBC TV movie *Asteroid*. © NBC, Inc.

EDITOR'S NOTE

Watching for Asteroids

The recent TV movie *Asteroid* is only the latest manifestation of popular interest in the idea of global annihilation by asteroid impact. Almost a dozen books have been published on the subject in the past two years. In "Is the Sky Falling?" in this issue, the noted planetary astronomer David Morrison, himself a scientific advocate of the view that the threat is not trivial, takes an informed look at this subject. He places the concern into scientific perspective and ranks the recent spate of books along a spectrum ranging from those that reflect the consensus view of most scientists involved with impact threats to those he finds unacceptable from a scientific and factual viewpoint.

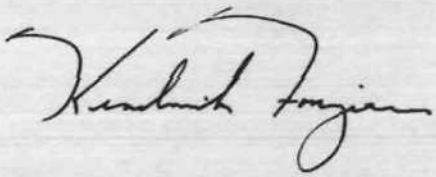
Morrison was chairman of the congressionally mandated 1992 NASA study of ways to carry out a comprehensive survey of potentially threatening comets and asteroids. One of the leading figures in the exploration of the solar system, Morrison is Director of Space at NASA Ames Research Center. He is also a prolific writer and educator. He wrote the NASA books *Voyage to Jupiter* and *Voyage to Saturn* about the Voyager missions to those planets. Longtime associates of CSICOP who remember well the beloved astronomer George Abell, a member of the CSICOP Executive Council who died of a heart attack in 1983, will be interested to know that Morrison and two other astronomers "inherited" Abell's top-selling astronomy text *Exploration of the Universe.* It is now titled *Abell's Exploration of the Universe,* by David Morrison, Sidney Wolff, and Andrew Fraknoi, and its seventh edition was published in 1995. A second textbook for nonscience majors, *Voyages Through the Universe,* with Fraknoi, Morrison, and Wolff as the authors, has just been published this year.

We've all seen it happen: the spontaneous, temporary spread of false beliefs within a population. Sociologists and social psychologists call them collective delusions or mass delusions. There's nothing pathological about them. They are an understandable dynamic of certain social situations that reverberate with our deepest concerns and fears. In this issue, sociologist Robert Bartholomew provides a valuable skeptic's guide to collective delusions. And he shows that no time and no society is immune to them.

For the past year, Emory University political science professor Courtney Brown has been hitting the lecture and talk-show circuits with a variety of outlandish propositions about extraterrestrials supposedly visiting Earth, described in his book *Cosmic Voyage.* In this issue Martin Gardner uses his regular column space to examine Brown's book, and Emory University psychologist Scott O. Lilienfeld considers the pragmatic and ethical conflicts involving Brown and academic freedom at their university. We also publish a statement from the university's president.

* * *

It is not usual for one publication to congratulate another. But I think congratulations are due to *Science News,* the Washington-based weekly newsmagazine of science, which is celebrating its seventy-fifth anniversary. For three-quarters of a century, *Science News* has provided the public with clear, careful, accurate, literate, and responsible coverage of the latest discoveries and issues of science. There is no better way for the lay reader (including scientists outside their own fields) to keep up with what's happening in science. *Science News* has always avoided sensationalism and provided a view of science as process—a view scientists and science educators have always advocated. I'm biased, of course, because I'm a former editor (1971–1977, when I came to *SI*), but I hope everyone will read *Science News*'s special March 1 75th Anniversary issue. Editor Julie Miller even points out that *Science News* was founded by scientists concerned about misinformation about science in newspapers and an increasingly superstitious mindset in the U.S. population. Sound familiar?



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Bombing Suspect McVeigh a Believer in Strange Government Conspiracies

No matter the final outcome of the trial of Timothy McVeigh, the Pendleton, New York, native and chief suspect in the Oklahoma City bombing, it's quite clear already that he has some bizarre, misinformed views.

McVeigh has been the focus of international attention since his arrest on April 21, 1995, in connection with the nation's worst act of domestic terrorism. His home for several months has been Englewood Federal Correctional Facility near Denver, Colorado, where his trial was moved from Oklahoma City.

When McVeigh's lawyer, Stephen Jones, first took on the case, he said the insanity defense would not be used, as McVeigh suffered from "no mental defect." But McVeigh does believe in many unfounded claims similar to the reports found in today's most popular government-conspiracy newspapers and other publications. Today, anyone with access to a press, radio, or computer system is able to hawk paranoid conspiracy theories—from the claim that the U.S. government is hiding the bodies of men from outer space to the "mystery" of the untimely death of Commerce Secretary Ron Brown. We can look at a few of McVeigh's beliefs, according to the people who have known him.

After the April 19, 1995, bombing in Oklahoma, federal investigators were pointed in the direction of McVeigh by Carl E. Lebron Jr., a former coworker of McVeigh's. McVeigh worked two security jobs in Buffalo, one in 1988 before he joined the army, and one in 1992, after his military discharge. Richard A. Serrano, of the *Los Angeles Times*'s Washington, D.C., bureau, reported exclusively on January 4, 1997, that Lebron, who worked with McVeigh at the 1992 job, "was the first to recognize the FBI's composite drawing of the suspected bomber [John Doe #1] as McVeigh."

Lebron was the first to tell authorities of McVeigh's strange beliefs, the *Times* reported. McVeigh thinks, or at least did at the time he worked with Lebron, that flying saucers exist and that miniature submarines are sneaking illegal drugs into the U.S. The *Times* noted, "McVeigh thought the company work site they were guarding . . . was involved in illegal narcotics trafficking—proving the government is behind drug problems in the United States."

The seeds for this type of thinking were likely planted in McVeigh prior to his enlistment in the army, through his associations with gun enthusiasts at a hunting store where he was employed and through weapons literature he read, including publications critical of federal gun-control measures. That McVeigh was exposed to conspiracy beliefs in his hometown is not surprising. At least one local radio station receives five to ten calls each morning from listeners spouting John Birch Society views. For those not familiar with the Birchers, they believe that "powerful insiders are manipulating global events to create a totalitarian, atheistic one-world government," as reported July 28, 1996, by Roy Rivenburg of the *Los Angeles Times*.

When I met with Jennifer McVeigh, Timothy's younger sister, for interviews, I found someone with views similar to her brother's—strong distrust in government and the media. Jennifer has been highly influenced by her brother and shared letter correspondence with him during and after his military years. Jennifer wrote to a local newspaper, the *Union-Sun & Journal* (Lockport, New York), one month before the bombing occurred. She said Americans are "being brainwashed into giving up our rights." She also said the Constitution is being "perverted" by our government leaders. The *Buffalo News* reported on May 7, 1995, that Jennifer's reading list has included such conspiracy-mongering publications and pamphlets as "You May Not Have a Country after 1995," "The New World Order," "Watch Out for Martial Law," and "Warning, It's Dangerous to Be Right When the Government Is Wrong."

Timothy McVeigh's belief that the government is corrupt even centered on himself after the Gulf War. He told friend James Nichols that the government had implanted a computer chip in his buttocks to monitor his movements. Nichols made an appointment with a doctor to get it checked out, but for some unknown reason McVeigh didn't go. Nichols' brother, Terry, has also been charged in the bombing and will go on trial after McVeigh. Readers of the SKEPTICAL INQUIRER will recall James Nichols. Regular columnist Robert Sheaffer wrote in the March/April 1996 issue that Nichols once kept a useless "cloud buster" (a device that will supposedly bring rain) at his Decker, Michigan, farm. McVeigh kept company with people possessing similar beliefs.

McVeigh told his sister, in so many words, that the government was also watching him in 1995. In a personal letter dated March 25 of that year—just a few weeks before the bombing—McVeigh told his sister that he feared "G-men" might intercept his mail to her, or that if she sent him a letter, the "G-men" might take it from his post office box in Arizona and "incriminate" her. What she would be incriminated for was not made clear.

Conspiracy believers and theorists will tell you, "No one is seeing the big picture," which is exactly what McVeigh wrote to the *Union-Sun & Journal* in 1992, in a letter critical of government operations. The "big picture" for many apparently is that a small group of powerful insiders control world events, and they seek to take our money and free-

dom so they may rule with absolute power. *George* magazine reported in November 1996 that three-quarters of Americans believe the U.S. government is involved in conspiracies. McVeigh may not be in good company, but he certainly is in big company.

—*Brandon M. Stickney*

A former newspaper reporter, Brandon M. Stickney is the author of "All-American Monster": The Unauthorized Biography of Timothy McVeigh, *published in 1996 by Prometheus Books. He can be reached by writing to P.O. Box 581, Lockport, NY 14095.*

Ten Years of Skepticism: Top Ten Paranormal Phenomena of the Decade

Our colleagues at the British magazine The Skeptic *celebrated their tenth anniversary in January with a Top-Ten survey of paranormal phenomena of the decade. To share in their celebration, and with their permission, we're providing the survey to* Skeptical Inquirer *readers. With thanks to Wendy Grossman and coeditors Toby Howard and Steve Donnelly.*

The top ten paranormal phenomena of the decade, in reverse order, are:

10 **Most irrelevant use of astrology:** Sky Sports hiring Mystic Meg during the semifinals and finals of the 1996 U.S. Open Tennis Championships to tell us about the players what anyone who had been watching the previous day's coverage would have known.

9 **Most useful lesson the Duchess of York could learn from Hillary Clinton:** Make sure your psychic counselors are dead. (Late in 1996, the Duchess's psychic published a confide-and-tell book about their relationship; Hillary Clinton revealed early in the year that she was in the habit of calling up the spirit of Eleanor Roosevelt when she wanted advice.)

8 **New British pseudoscience most likely to endure:** Cereology, the study of crop circles. Admissions by hoaxers have not deflected the UFOlogists, dowsers, healers, and weather cranks from continuing to believe that the universe is trying to tell us something.

7 **Most wasted opportunity for psychics to get rich quick:** Magician and paranormal investigator James Randi's $1 million prize offer to anyone who can demonstrate paranormal powers under proper observing conditions.

6 **Government program that has done the most to undermine public understanding of statistics:** The National Lottery.

5 **Most inventive creationist explanation of why the earth appears to be billions of years old, instead of the 6,000 years they believe the Bible states:** The speed of light is slowing down.

4 **Most unproductive use of the Internet:** Uri Geller's $1 million challenge to Internet users to bend the spoon in the transparent safe in his home. Users logged onto Geller's Web site to watch the spoon via a digital camera. If it bent, they got to do it all over again by telephone and then in person in front of Geller and a representative of his insurance company. Prediction: The primary beneficiaries of this exercise will have been the phone companies and Geller's insurance company.

3 **Most unwanted U.S. import:** Belief in alien abductions.

2 **Most unwilling control group:** Transcendental Meditation, whose members claim to lower the crime rate in areas where they have established permanent settlements. Although the TMers have been established in Iowa for many years, the safest place to live in America (according to CNN) is Amherst, New York, home of the Committee for Scientific Investigation of Claims of the Paranormal (CSICOP), the world's largest and oldest skeptical organization.

1 **Resurrection, the proof:** The reappearance of belief in angels.

The Skeptic, *a bimonthly, can be reached at P.O. Box 475, Manchester M60 2TH, United Kingdom. Its Web site is http://www.cs.man.ac.uk/skeptic/.*

A Curious Corpse for the Day of the Dead

At first it looked like a case of incredible psychic sleuthing. The psychic reportedly directed Mexican authorities to a spot on a ranch belonging to Raúl Salinas, brother of former Mexican president Carlos Salinas. Raúl Salinas has been on trial for over a year in the slaying of Francisco Ruíz Massieu and is also suspected of the death of an alleged co-conspirator in Massieu's death, legislator Manual Muñoz Rocha. Rocha disappeared two years ago, after telling a friend he was going to meet Salinas. Digging in Raúl Salinas's back yard, police discovered a dismembered corpse, its fingers and teeth missing as if in an attempt to forestall identification.

The clairvoyant, Francisca Zetina Chávez—known as "La Paca" ("Paca" is a shortened form of "Francisca") and said to be the most powerful witch in her neighborhood—insisted on accompanying investigators to the site because, as she said, "From the vibrations I feel, I know that those remains are Muñoz Rocha and that he rose up from his tomb to point to the assassin." The discovery, which came just before Mexico's annual Day of the Dead celebration, captured Mexicans' attention.

What the 55-year-old mystic did not foresee was her own subsequent arrest. She was jailed in early February "as a central character in a scandal that has transfixed the nation and made a mockery of its criminal justice system, with disclosures of planted corpses . . . and a tangled relationship between witch and state" (*Boston Globe*, February 13, 1997).

Mexican authorities claim that La Paca persuaded her son-in-law to obtain a corpse, and he disinterred the remains of his own father. La Paca and her "spiritual group" then transported the remains to the ranch site in an old Dodge pickup. According to the *Globe*, "The skeleton-planting scheme appears to have been an attempt either to frame Raúl Salinas for another murder or to torpedo the investigation into one of Mexico's most sensational murders ever."

—Joe Nickell

Joe Nickell is CSICOP's senior research fellow.

ABC Documentary Takes on 'Junk Science': Responsible Science on TV

What a pleasure it is to see responsible treatment of science and pseudoscience on network television. On the night of January 8, an episode of ABC's *Coach* had assistant-coach Dauber, convinced he was having UFO abduction experiences, threaten to leave this world and live with the aliens. There was no suggestion that UFO abductions are real; instead the episode portrayed an attention-hungry Dauber looking for escape from his responsibilities. An expression of love and respect from Coach brought Dauber back to reality.

The following evening, January 9, ABC broadcast a one-hour program, "Junk Science: What You Know That May Not Be So," hosted by John Stossel. The "Junk Science" program followed a week of shorter skeptical pieces on ABC on various scientific controversies. These included a January 3 *20/20* segment on "multiple chemical sensitivity" and a series of daily *Good Morning America* pieces on issues such as fear of electric and magnetic fields. (CSICOP provided assistance with the "Junk Science" special and several of these segments.)

"Junk Science" first pointed out the almost religious faith we have in science because of its many successes, and our resulting gullibility in the search to avoid disease, aging, and death. Examples included electric belts, healing with radio waves, cosmetic mumbo-jumbo, chemical sprays, bloodletting, vitamin C to prevent colds, and supposed health benefits of spinach, which originated with a decimal point error in iron content.

Next came an analysis of incentives for scientists to jump to the wrong conclusions: greed; powerful empires wishing to control science; fame and glory, as in the case of cold fusion; or money, as in the case of the tobacco industry's denying that smoking causes cancer.

The program gave examples of established institutions resisting evidence not to their interest—the church's persecuting Galileo and the National Heart Lung and Blood Institute's resisting evidence that not all of us need cut back on salt.

Next came a strong criticism of the legal system. When it comes to science, Stossel said, many courtrooms seem happy to embrace junk. The case of an "expert" witness whose testimony sent dozens to prison on the basis of bite marks invisible to others gave a chilling picture of what the courts accept. It was followed by a discussion of breast implants, hyped by TV talk shows, lawyer ads, jury awards, expert witnesses, all without evidence that the implants caused any increase in connective tissue disease. Stossel noted that experts in court need only say "in my experience" instead of presenting evidence.

The Love Canal and Times Beach cleanups were offered as examples of political rather than scientific decisions and contrasted with a large dioxin spill in Italy that was long ago covered with earth and turned into a public park with no ill effects.

Despite the lack of evidence that babies born with cocaine addiction were fated to do poorly, the message apparently gained wide support because it appealed to both liberals and conservatives.

Stossel noted that science generally reaches the right conclusion in the long run; it isn't a one-study endeavor. By weeding out those theories not supported by evidence, we gradually build a more accurate picture of our world. The

best we can do is look at the scientific consensus.

This program was a refreshing invitation to viewers to think critically about what we think we know. If all networks were to avoid preying on the gullible, our voters could act with more intelligence. Good marks for ABC.

—*John Geohegen*

John Geohegen is president of New Mexicans for Science and Reason. This item appeared originally, in slightly different form, in the group's newsletter, NMSR Reports.

Data? Research? No Such Thing for Would-Be Buyers of 'The Stimulator'

If you have ever watched late night TV, then you know there are a lot of "infomercials" trying to get you to spend your money. One show caught my eye, and I decided to do a little research into the product.

I called the number and asked the woman on the other end of the line if she could tell me how "The Stimulator" worked, as the infomercial did not. The Stimulator is a device that looks a lot like a hypodermic needle—without the needle but with a silver ball on the tip. You press the ball to an area of your body in which you have pain, and the Stimulator is supposed to ease the pain. The woman gave me their customer service number, which I called.

A young woman named Kim answered the phone, and she was happy to answer my questions. The Stimulator is used to stimulate the body's "endomorphins" and thus reduce pain, she said. It can be used on accupressure points and is based on reflexology, and it can be used like a TENS (transcutaneous electrical nerve stimulation) unit also, as it generates static electricity.

How does it do that? "Well, there are two piezo crystals in the unit, which has a spring that is used to compress the crystals. This compression causes static electricity to form and when the spring is released you get a little shock . . . but . . . you really can't feel it." What about watts and volts? "Thirteen thousand volts of static electricity!"

Is the Stimulator approved by the FDA? "No, the Stimulator is not a healer. It is a helper. We don't think we need FDA approval. And, no, we are not going to seek that approval." What about data or research? She did not know about anything that may be found in medical journals but said there was a "90 percent success rate." How did they arrive at that number? "Only 10 percent have been returned under our money-back guarantee." So, that means that the 90 percent not returned gave pain relief? Kim did not know. Who would know? "You will have to call back on Monday and talk to Lonn Tyler. He heads up the consumer service department."

I called Lonn Tyler, and he gave me the same information that Kim provided. I told him I would like to see some research on the Stimulator and was told that could not be sent as it was "not available to the public." I asked what he meant by "not available to the public." He said there was no data or research that he was aware of that could be sent to me or that I could find in the literature. I asked for the next person in the organization who might have some idea as to where I could find some research data on the Stimulator. He said there was no other person. I asked, then, if he was the inventor. He said, no, he was not the inventor, and he did not know who the inventor was. I then asked if there was anyone over him and, since he did not have a clue about the product other than that it "works by crystals," how could a consumer find out about the product? "Well, just send $79.95 plus $10 postage and handling, and the product with a video and everything you need to know will be sent to you."

The hour or so I spent going in circles with the Stimulator people—which they paid for (1-800-609-1020)—was an hour or so they did not make any money. With the year 2000 coming, we will no doubt be seeing a lot more of this kind of stuff for sale on TV and radio, and in magazines, newspapers, and other media.

—*Melton L. Francis*

Melton L. Francis is a clinical social worker and a professional magician. He can be reached at 236 Village Lake Dr., Derby, KS 67037.

The Podkletnov Gravity Shield: *Business Week* Levitates Again

The following appeared in the February 7 American Physical Society "What's New" electronic newsletter and is printed with permission:

It was the lightweight story of 1996: a rotating superconducting disk that reduced the weight of an object placed above it ["What's New," September 27, 1996]. Now *Business Week* is at it again in the February 17 issue. According to the story, John Schnurer at Antioch College measured a 5 percent drop in weight with such a shield, and scientists at NASA are eagerly trying to repeat the measurement. Ho Jung Paik, a leading gravity experimentalist at Maryland, said he was aware of the earlier claim, but dismissed it: "Gravity is such a weak force that errors are difficult to avoid." When told of the *Business Week* story, Arthur Komar, head of Gravitational Physics at the National Science Foundation, said, "I'm speechless." After he stopped laughing, he added: "This is inappropriate for *Business Week* to report on; *Business Week* has no standards or criteria by which to evaluate scientific claims. It should be left to scientific journals."

—*Robert L. Park*

Council for Media Integrity Blasts Networks for Distorted Treatments of Science

The opening salvos in the new Council for Media Integrity's campaign to improve the treatment of science in television entertainment programming were fired in Los Angeles—the heart of the TV and movie entertainment industry.

The Council, established last June by the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP), held its first meeting and first news conference January 9 at the Los Angeles Airport Hilton Hotel. The Council was formed to closely monitor and quickly respond to distorted treatments of science and uncritical presentations of paranormal and fringe-science claims in the media.

The Council attacked the major television networks for running two or three pseudoscientific specials almost every month. "Recently there have been programs on prophecies, astrology, psychic powers, creationism, Noah's Ark, angels, and alien abductions," said the Council. All of them posed, in some way, as being based on scientific fact.

The Council also criticized the many talk shows devoted to the paranormal in which claims in favor of the paranormal are given a platform but the scientific viewpoint is rarely allowed.

The Council's two co-chairs, entertainer and author Steve Allen and Nobel laureate nuclear chemist Glenn T. Seaborg, called for the television industry to exercise greater responsibility toward science and truth.

Bill Nye, Eugenie Scott, Glenn T. Seaborg, and Steve Allen confer after the first meeting and news conference of the Council for Media Integrity. Nye received the Council's first "Candle in the Dark" Award for his TV series *Bill Nye the Science Guy.*

Allen emphasized that the Council's concerns are not with entertainment programs that honestly present themselves as fictional dramas. "We are talking about shows that are presented as if they are true, as reality," said Allen, creator and host of the original *Tonight Show*, producer of the award-winning *Meeting of Minds* television series, and author of nearly fifty books, including "*Dumbth": And 81 Ways to Make Americans Smarter* (Prometheus 1991). Allen has been a long-time advocate of critical thinking.

He and other speakers emphasized that series like *Star Trek* and *The Twilight Zone* never crossed that line and are not of concern. But a recent disturbing trend is "reality-based" TV programming in which fictional dramas or pseudodocumentaries claim or at least imply that they are based on truth and scientific fact.

"I call them damn lies," said Allen. "How," he said, referring to their producers, "do you approve of irresponsibility and lies?"

Seaborg, discover or co-discoverer of eleven elements including plutonium, former chairman of the Atomic Energy Commission, and current associate director at large of the Lawrence Berkeley National Laboratory, pointed to the discouraging state of scientific literacy in American society.

Fund for the Future

CSICOP AT THE CENTER FOR INQUIRY

An Unprecedented $20 Million Drive for the

Human beings have never understood the material universe as thoroughly as they do today. Yet never has popular hunger for superstition, pseudoscience, and the paranormal been so acute.

CSICOP and the *Skeptical Inquirer* are leading advocates for skepticism nationally and worldwide. But so much more must be done in the years to come.

Day and night, the Center for Inquiry has become a focus of academic and popular inquiry.

Publishing revenues alone cannot fund the bold outreach today's challenges demand. Hence the Fund for the Future Campaign, a ten-year effort to add 20 million dollars to the Center for Inquiry endowments.* Gifts and endowment income will fund projects including:

Council for Media Integrity

Formed just weeks after its inclusion in the Ten-Year Plan, the Council for Media Integrity will monitor and rebut media programs that convey unfounded claims and mislead the public about science. Members include Steve Allen (chair), Carl Sagan, Stephen Jay Gould, and many others. CSICOP will invest in electronic infrastructure to facilitate rapid response to irresponsible programs.

Adult Education

The Council cosponsors the Center for Inquiry Institute, which has already expanded its offerings to include a new three-year certificate program in science and skepticism. Sessions are scheduled in Amherst and Los Angeles.

Enhancing Library Resources

The Center for Inquiry's skeptics' library—already the finest of its kind in the world—needs expanded funding to enlarge its core collection and add electronic media. Worldwide modem access to the library's catalog is already nearly complete.

*Combined endowment goal of CSICOP and the Council for Secular Humanism, both nonprofit tax-exempt educational organizations.

Steve Allen
Honorary Co-chair

Martin Gardner
Honorary Co-chair

uture of Science and Reason

The New Ten-Year Plan

To continue its leadership in the defense of reason, CSICOP has articulated a Ten-Year Plan designed to:

- *Promote science and reason*
- *Develop public support and participation*
- *Develop The Center for Inquiry as an education and research center*
- *Build up the Committee's resources*

The Center for Inquiry attracts global media attention with scholarly conferences and events like this public "Friday the 13th Superstition Bash."

For the Young

To present skeptics' message more compellingly to the young, CSICOP will develop new materials—ranging from age-appropriate print publications to audio and video cassettes and instructional courseware. Goals include enhanced understanding of science and improved critical thinking skills.

Regional Outreach

With the establishment of The Center for Inquiry - West (Los Angeles), The Center for Inquiry - Midwest (Kansas City) and The Center for Inquiry - Rockies (Boulder, Colorado), giant steps have been taken to enhance direct field service to skeptical activists. Additional regional Centers are planned with expanded calendars of activities.

How Can I Help?

The Center for Inquiry Fund for the Future depends on generous support from each of our readers and friends. Gifts of cash, securities, and other assets are sought. A three-year pledge can make more substantial gifts surprisingly affordable. Many forms of planned giving arrangements can be arranged. All requests will be held in confidence.

Only financial support from skeptics and other friends of science can place the skeptical movement on a firm financial foundation.

At the first World Skeptics Congress in Amherst, New York, participants gave or pledged an unprecedented $201,000 to give the Fund for the Future campaign a vigorous start.

We invite you to make your commitment to the Fund for the Future today. For more information, complete and mail the postpaid reply card.

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at the
Center for Inquiry
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(716) 636-1425
FAX (716) 636-1733

"I have been interested in the general problem of scientific literacy since just before Sputnik," said Seaborg. "So I have been an advocate of scientific literacy for nearly forty years." He was a leader behind the famous study "A Nation at Risk" that identified a need for renovation of pre-college science education to advance scientific literacy.

"We have a problem with regard to the amount of pseudoscience facing us," Seaborg said. "One solution is increasing the scientific literacy of the general public." Unfortunately, he said, too much television programming has the opposite effect.

CSICOP founder and chairman Paul Kurtz said the media have now virtually replaced the schools, colleges, and universities as the main source of information for the general public.

"The irresponsibility of some of the media in the area of science and the paranormal is a worldwide problem. But it especially applies to the United States, where the media have been distorting science, and in particular presenting pseudoscience as genuine science. Indeed, we are appalled by the number of 'documentaries' that are really entertainment programs presenting fringe science as real science.

"We believe that the media have presented a distorted view of science," Kurtz said, and that they have a responsibility to provide a more balanced view of what is real science and what is pseudoscience.

"We are asking only for some balance. We are asking TV not to dramatize pseudoscience as real science.

"We are not, of course, asking that TV producers not run these shows or make a profit," Kurtz added. "We surely do not wish to censor the media. We only ask that they provide some balance and some appreciation of the scientific approach. The Council will monitor such programs and attempt to persuade producers, directors, writers, and the general public to leave room for the appreciation of scientific methods of inquiry."

Kurtz, recovering at the time from surgery, spoke to the news conference via videotape. Barry Karr, CSICOP's executive director, hosted.

Council member Eugenie Scott, director of the National Center for Science Education in Berkeley, California, said the concern is that science be presented honestly. "We offer to provide our help, our expertise to help you do a better job," she said. "We would like to encourage you to consider that science, in and of itself, is exciting, creative, and wonderful.

"You don't have to present the crackpot stuff to be interesting."

CSICOP staff member Tom Flynn lamented the increasing blurring of entertainment and fact-based programming. He showed excerpts from NBC's notorious 1996 pseudoscientific, documentary-style "Mysterious Origins of Man," which presented, as Flynn put it, "the utterly baseless idea that dinosaurs and man lived at the same time."

"This program did probably more than any other to reinforce the idea that dinosaurs and man co-existed."

Scott, a physical anthropologist, agreed that much of what goes on in school is absolutely swamped by television. The day after the NBC program aired, she said, science teachers throughout the United States were deluged with questions from their students about dinosaur-human coexistence. She said this single program set back science education on this topic by decades.

—Kendrick Frazier, Editor

Nye, Aykroyd Receive Council's First Awards

Bill Nye, creator, writer, and host of the award-winning PBS and syndicated television series *Bill Nye the Science Guy,* was honored by the Council for Media Integrity for his program, targeted at young people, which presents science as a lively, creative, and fun endeavor. Nye was given the Council's first "Candle in the Dark" Award for his outstanding contributions to the public's understanding of science and scientific principles.

Bill Nye the Science Guy (see *SI,* January/February 1997) is a joint production of PBS, Disney, and the National Science Foundation and is telecast daily in most big-city markets. He was presented his award by Kendrick Frazier, editor of the SKEPTICAL INQUIRER.

Nye was once a student of Carl Sagan's at Cornell University. He said he was delighted to receive an award linked in any way to Sagan, who died December 20 and whose last book, *The Demon-Haunted World,* was subtitled "Science as a Candle in the Dark." He thanked CSICOP and the Council for recognizing his program as a contribution to the nation's science education.

In marked contrast to Nye's award, the actor Dan Aykroyd was presented in absentia the Council's "Snuffed Candle" Award. Aykroyd is host of the new television program *Psi Factor* and has been a long-time promoter of all sorts of paranormal claims. The award recognized Aykroyd "for encouraging credulity, presenting pseudoscience as genuine, and contributing to the public's lack of understanding of the methods of scientific inquiry."

CSICOP Senior Research Fellow and Council member Joe Nickell said he had been trying to inform Aykroyd of the award by mental telepathy but had not yet had any response. He said he would attempt to send the handsome plaque to Aykroyd by telekinesis.

* * *

Following up on the events in Los Angeles, Nickell wrote to Aykroyd on behalf of the Council requesting that Aykroyd and OSIR (Office of Scientific Investigation and Research—the research group behind the "cases" presented on *Psi Factor*) provide "full particulars" on a *Psi Factor* episode in which NASA scientists are killed while investigating a meteor crash and giant eggs are found and incubated, yielding a flea the size of a hog. Nickell made the request in response to a statement by Aykroyd on *Entertainment Tonight* that skeptics would have to withdraw their criticism once they've seen the OSIR data. It remains to be seen whether Aykroyd and OSIR will provide the data.

CSICOP to Become Shareholder in TV Networks

To provide leverage for its response to the television networks' lucrative commercial marketing of fringe science *and pseudoscience, CSICOP is asking* friends and supporters to help it acquire common stock in media conglomerate companies. This will allow CSICOP to take part in shareholder meetings, where it can question the infatuation with the paranormal increasingly demonstrated in television programming.

"We are deliberately targeting each *of the four major television networks,* which is to say, the well-known media conglomerates Westinghouse (CBS), General Electric (NBC), NewsCorp (Fox), and Disney (ABC)," said a CSICOP statement issued in Los Angeles. Also targeted is Time Warner.

"As a 'shareholder,' CSICOP will have opportunities to attend shareholder meetings, submit viewpoints to *shareholder publications, and sponsor* shareholder resolutions. While exercising these and other shareholder rights, we will be representing the broad constituency of readers and donors who support CSICOP and the SKEPTICAL INQUIRER magazine."

CSICOP 20th Anniversary Conference

"Science in the Age of (Mis)Information"

SESSION TAPES First World Skeptics Congress

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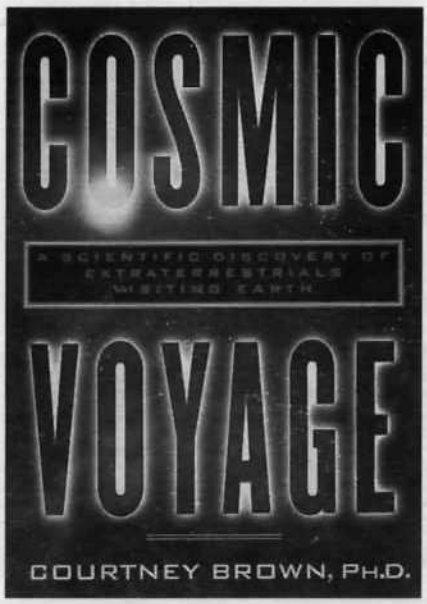
Courtney Brown's 'Cosmic Voyage' into Preposterism

***Cosmic Voyage: A Scientific Discovery of Extraterrestrials Visiting Earth.* By Courtney Brown. Dutton, 1996. 275 pp. $23.95.**

My first reaction to this preposterous book was, "It's a hoax." But no, Courtney Brown actually exists. An associate professor of political science at Emory University, in Atlanta, Georgia, he has written several books about social science and one on mathematics titled *Chaos and Catastrophe Theory*. A "Ph.D." follows his name on the front of the jacket.

On the back cover are two laudatory blurbs. One is by Whitley Strieber, author of many books about UFO abductions, including his own abduction. The other is by Harvard psychiatrist John Mack. Mack firmly believes that aliens from higher space-time dimensions are visiting Earth and taking humans aboard their spacecraft to perform on them unspeakable operations. His 1994 book *Abduction*, published by Scribner's, was a bestseller. Harvard can't get rid of him because he has tenure.

After TM (transcendental meditation) training—his wife is a TM instructor—Brown says he mastered the advanced



TM-Sidhi Program, which teaches "Yogic flying" and other sidhis such as making oneself invisible and walking through walls. He highly recommends two books by the Maharishi. Brown next attended the Monroe Institute, in Faber, Virginia, where he learned telepathy and attained a high level of consciousness. He urges readers to obtain three books by Robert Monroe.

Brown's final level of training was by an expert in SRV (scientific remote viewing), a recent term for clairvoyance. He claims to have acquired not only the ability to remote-view distant spots on Earth, but also the abilities to see remote parts of the universe and witness historical events both in the distant past and in the far future. Readers who want to develop similar powers are urged to contact Brown at his Farsight Institute, Box 49243, in Atlanta. For three thousand dollars you can take a one-week course in remote viewing, with follow-up courses for additional fees.

Cosmic Voyage is a record of staggering "facts" Brown uncovered in more than thirty SRV sessions under the supervision of a man he calls his "monitor" or "instructor." Brown never names him, but he is known to be Ed Dames, a retired army major, now president of a psychic research organization called Psi-Tech, based in Beverly Hills, California.

Before Brown became Dames's pupil, Dames was on record as an ardent believer in a Galactic Federation of aliens who roam the galaxy in advanced spacecraft. He believes that Martians are living in New Mexico, that there are alien sites on the moon, and that the stone "face" on Mars was carved by a Martian civilization. For a while he was associated with the ill-fated, ten-year research project Stargate, sponsored by the CIA to investigate possible military uses of remote viewing. After spending some twenty million dollars, the CIA closed down the project as a waste of taxpayer money.

Brown's remote viewing sessions, supervised by Dames, enlarged greatly on Dames's beliefs. Critics of remote viewing point out that the easiest way results can be contaminated is by what is

Martin Gardner's latest book is Weird Water and Fuzzy Logic *(Prometheus 1996), a collection of sixteen recent* SKEPTICAL INQUIRER *columns plus thirty-three book reviews.*

called "front loading." This means that the monitor, or the subject, sometimes both, knows in advance what the "target" is. In Brown's sessions, Dames always knew the target. The possibility of conscious or unconscious influence over the subject, by comments and leading questions, is obvious. Because Brown's sessions were front-loaded, even parapsychologists who believe in remote viewing consider his sessions worthless.

According to Brown, millions of years ago a race of hairless humanoids lived on Mars. They had big eyes, light skin, and telepathic abilities. A wandering comet or maybe an asteroid grazed the planet, severely damaging its atmosphere and rendering the red planet unfit for habitation. The Martians were forced to move into underground caverns where most of them still are today.

A Galactic Federation of superbeings dispatched to Mars a rescue team of altruistic humanoids called the Greys (because of their color). The Greys had earlier been forced to abandon their planet after carelessly allowing its environment to degenerate, much as we are now allowing ours. Their culture's collapse was facilitated by a mysterious evil dictator who suffered from "low self-esteem" and may have been none other than the biblical Lucifer.

Before the Greys lost their homeland, they lived mainly on fish. Their sex drive was then much stronger than ours, although their "genitals were quite small by human standards." The Greys are short, with heads shaped like a praying mantis's and huge black eyes. They communicate by telepathy and have a lifespan of two hundred years.

These benevolent superbeings have spacecraft capable of going galactic distances at speeds faster than light and of moving back and forth in time. They can alter matter, permitting their ships to fly right through mountains, just the way they did in Spielberg's movie *Close Encounters*. The Greys are slowly evolving into still higher beings and eventually will "merge with God."

In recent decades several hundred Martians have been transported by the Greys to a spot north of Santa Fe, New Mexico, where they live in caverns beneath the mountain called Santa Fe Baldy. Their technology is 150 years ahead of ours. They are no longer bald. Thanks to their genetic engineering they are beginning to look like us. They have their own spaceships, which soon will be helping the Greys to bring more Martians to Earth. Indeed, the base at Santa Fe Baldy will eventually become an immigration processing center for Martian refugees.

Another group of Martians has been taken by the Greys to an unidentified village in South America, where they live disguised as native Indians. The Greys were able to alter Martian genes so they can withstand Earth's stronger gravity and breathe our atmosphere. Both the Martians and the Greys are much concerned over how rapidly we are destroying our environment. They are eager to help mend our ways but are unwilling to contact us until we make the first move of letting them know our desire to contact them.

Brown somehow discovered *The Urantia Book*, a mammoth tome purporting to be written by celestials under the supervision and editing of Dr. William Sadler, a well-known Chicago psychiatrist who died in 1969. Brown buys *The Urantia Book*'s claim that living among us, doing their best to aid us, are invisible beings called Midwayers (because they are on a plane midway between us and angels). "The discovery that the Midwayers actually exist," Brown writes, "was a shock that reverberated through the consciousness of the military's SRV team for quite a few years."

Brown believes that *The Urantia Book* is mostly accurate in its cosmology and its elaborate hierarchy of billions of higher entities and gods, including Jesus. His main objection to *The Urantia Book* is its failure to recognize reincarnation. Brown considers us composite beings. Our physical body grows old and dies, but a spiritual entity or "soul"—Brown persists in calling it our "subspace"—is immortal. After the human body dies, the soul travels upward forever, as *The Urantia Book* teaches, to inhabit more advanced bodies on other worlds. Thus Brown and *The Urantia Book* agree on endless reincarnation after death but disagree on our having had incarnations before birth. (For more than you may care to know about the Urantia movement, see my *Urantia: The Great Cult Mystery*, published by Prometheus Books in 1995.) At the moment, Urantians are divided over whether Brown's book is good publicity for their bible, or whether it is bad publicity because of Brown's other wild beliefs.

In remote-viewing sessions with Dames, Brown visits both Martians and Greys many times, entering their minds to learn their deepest secrets and motives. He interviews a translucent Jesus whose hair seems made of light. Jesus is friendly and has a great sense of humor. Brown also visits the Buddha and Guru Dev who was the Maharishi's mentor. He remote-views President Clinton in the Oval Office. Dames tells Brown, "I could have had you go into his head, but that would have been an invasion of privacy." I found this the funniest line in Brown's book.

Brown moves back millions of years to view the desolation of Mars after it was damaged by the comet or asteroid. He goes forward three hundred years to witness the tragic plight of humans on Earth after our environment has hopelessly deteriorated. He contacts members of the Galactic Federation. He visits a world in the Pleiades star cluster where he sees bewildered Americans who have been taken there by the Greys to preserve their genetic stock. The planet has two suns, one large and yellow, the other a smaller white dwarf. Brown believes some UFOs may be piloted by humans from our future. "It sounds weird," he told a reporter, "but I suppose you could be watching a ship fly by and you, as a future human, could be in it."

Our hopes of surviving the dark days ahead depend on how soon we decide to meet and cooperate with the Martians and Greys. Brown has not the slightest doubt that our government knows all about these aliens and their frequent abductions of humans so they can

FRINGE-WATCHER
continued on page 54

INVESTIGATIVE FILES
JOE NICKELL

Mystery of the Crystal Tears

Gosh, I thought after watching the new TV series *Psi Factor*, those Office of Scientific Investigation and Research (O.S.I.R.) types sure seem cool. "Case file 20168," they begin. They make sure their phone calls go out over "secure lines"—real Secret Agenty stuff! And the equipment they use, like Magnetometers—wow! According to the *Psi Factor* Web Page, these are used because "fluctuations in the magnetic spectrum are common in coincidence with anomalous activity." Really? I don't think there's evidence that ghosts have magnetic personalities, but I've always wanted to talk like that. I began to dream of the possibilities. . . .

Suddenly, I perceived a dark shape approaching. Was it real or—? I broke off in midthought to reach for an O.S.I.R. Spectral Photometer, a "sophisticated device" used to "determine whether unusual phenomena is [*sic*] real or if the phenomenon is a purely subjective experience." It showed I was right: I was dreaming. Then I realized I wasn't in a *Psi Factor* episode; and the dark shape wasn't the host, "actor/writer/producer/musician Dan Aykroyd, a lifelong student of the paranormal."

It was actually Barry Karr, CSICOP's executive director. Apparently I had fallen asleep at my desk again. I raised my head, pushed aside my Maltese Falcon paperweight, and asked, "What is it, shweetheart?"

"Martini lunch again?" he asked. I let that pass. "Here's the video from New York you've been expecting," and he walked off.

"Oh yeah." Now it was coming back to me. I had agreed to look into the case of a young Lebanese girl who "miraculously" produced "crystal tears" from her eyes. A Brazilian TV production company —the largest in South America—was doing the story and wanted CSICOP's view. They had rushed the video from their New York office.

Now I knew why I was thinking of Aykroyd. Episodes of his new Fox TV series *Psi Factor* are "fictionalized" from "closed cases" taken from the files of O.S.I.R., a group whose "methods and technical support run the gamut, from state-of-the-art science to folklore and mystic philosophy." Their "lab facilities" (and tarot-card divination quarters?) are located in "Central California." (Where better to mix science with mystic philosophy?) (*Psi Factor* Web Page 1996.)

It's pretty easy to see why they use the term "fictionalized." One episode features a meteorite that has brought with it some huge eggs. These hatch into gargantuan fleas that kill a team of NASA scientists (*Psi Factor* 1996). (Does NASA know about this?)

Aykroyd hosts the show, which is coproduced by his brother, another man, and a magician named Christopher Chacon. Chacon (to finally get to the point) is supposedly a professional conjurer who investigates paranormal claims. One of these claims was an earlier case of "crystal tears" that was featured on NBC's *Unsolved Mysteries* in 1990. This program gives us a chance to assess Chacon's critical acumen—or lack

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Pathological Science

Photo 1. "Crystal tears"—actually natural quartz crystals known as "Herkimer diamonds"—are obtained for the purpose.

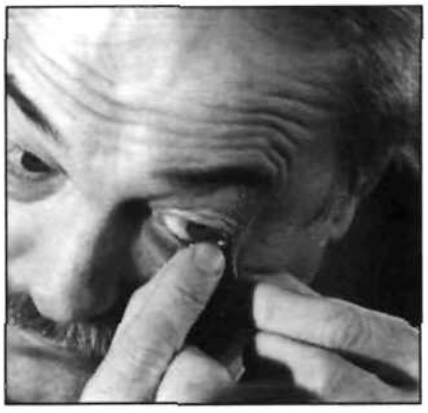

Photo 2. The author demonstrates how the lower eyelid is pulled out and a crystal inserted.

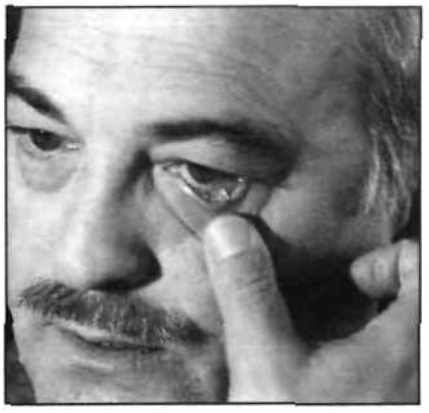

Photo 3. A tug on the lower lid causes the "crystal tear" to come into view. (Photos by Tom Flynn)

thereof.

The program heralded "a woman named Katie," whom her psychiatrist—paranormal-enthusiast Berthold Schwarz—described as "a great, classical physical medium" and "a medical marvel." She demonstrated a wide variety of alleged psychic phenomena, notably producing "apports"—such as a "glass stone, resembling a diamond" that supposedly materialized from her eye. Schwarz gushed his approval and stated he could not envision trickery being involved, although Katie's effects seemed to skeptics to be on a par with the efforts of a beginning conjurer. For example, the glass gem was never seen in her eye; rather, she covered her eye with her hand and then opened her fingers, whereupon the object fell from between them. Seen in slow motion, the effect was entirely consistent with the object having been hidden between her fingers. Indeed at the behest of CSICOP, magician Bruce Adams demonstrated the trick for the *Unsolved Mysteries* program.

However, before approaching CSICOP, the producer of the program had sought out Christopher Chacon. He responded to Katie's effects by stating: "From my observations I don't feel that she is, at present, utilizing magical abilities to produce the materials that she is producing. I don't think she is skilled in those particular aspects of sleight of hand or illusion" (Chacon 1990). I don't know whether or not Chacon works for O.S.I.R., but if Dan Aykroyd and his *Psi Factor* are relying on Chacon's critical skills, they might wish to reconsider. (Chacon's *Unsolved Mysteries* segment was not aired but was instead replaced by the one featuring CSICOP's duplication of Katie's major effects [*Unsolved Mysteries* 1990].)

I have presented this 1990 case not only for the light it sheds on the new television series but also because it serves as a useful introduction to the case at hand, that of the Lebanese girl who produces "crystal tears." As shown on a Globo International documentary, a twelve-year-old girl named Hasnah, who lives in Lebanon's fertile Bekaa Valley, has the apparent ability to produce small, crystal stones from her eyes. No sleight of hand is involved, since the camera zooms in close as the girl's father gingerly pulls down her lower eyelid and a crystal comes into view. It then pops out, whereupon it is shown to be a hard, faceted rock whose sharp points can cut paper. Her father believes the appearing crystals represent "a gift from Allah." Lebanese ophthalmologists say the stones are "crystal rocks," but otherwise they are reportedly unable to explain the phenomenon.

Hasnah, who claims to produce up to seven crystals a day, showed a collection of the allegedly apported rocks. From their rhomboidal shape and other properties, I recognized them as the natural quartz crystals generally known as "Herkimer diamonds." With the television crew being expected to arrive here the following day, I hastily made some phone calls and soon had acquired a handful of the gemstones. (See Photo 1.)

Although such stones are indeed sharp—and I could see a dark red spot inside the girl's eyelid that probably represented a wound from one of them—I decided to duplicate the effect. All that was necessary was to pull out the lower eyelid to form a pouch and drop in a small crystal so that it rested, only a bit uncomfortably, out of sight (Photo 2). A tug on the lower lid causes the stone to come into view (Photo 3) and then pop out of the eye. This I demonstrated at an appropriate time for the television camera, allowing their reporter to actually do the extraction himself. The effect was indistinguishable from the Lebanese "miracle."

The final product appeared on the Globo program *Fantastico*, described by one Brazilian correspondent as "one of the most popular programs in Brazil." He said he remembered the appearance of a CSICOP magician but not the name. (How fleeting is fame!) He found it an "interesting report" and offered a prediction that actually came true: that we would receive a number of subscription orders from it. Maybe soon we can buy some of that fancy O.S.I.R. equipment to play with.

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MEDIA WATCH

C. EUGENE EMERY JR.

When the Media Tell Half the Story

What a difference nearly three decades doesn't make.

Twenty-eight years after *Chariots of the Gods?* author Eric von Däniken brought pseudoscience to new lows by suggesting that our ancestors were too stupid to create the pyramids, Stonehenge, and other monuments without the help of space aliens, his ideas are alive and well thanks to a prime-time September 26, 1996, ABC-TV special, "Chariots of the Gods? The Mysteries Continue."

The show suggested that there might be new information to support von Däniken's theories that ancient drawings depict spaceships and our ancestors' knowledge of the universe must have come from extraterrestrials.

The odd thing was that the program gave plenty of hints to suggest that von Däniken is a crank. Yet ABC chose to gloss over the problems.

One of the first hints came when von Däniken talked about the ruins of the Aztec city of Tenochtitlán, where the main ceremonial plaza with its huge flat-topped pyramids was supposedly laid out in a way that produced "a remarkably accurate scale model of our solar system," complete with Uranus, Neptune, and Pluto, three planets invisible to the naked eye.

If anybody at ABC had known anything about astronomy, they should have questioned several aspects of the "model." First, if it was so accurate, why was the only big gap between Saturn and Uranus? (Answer: The layout wasn't intended to be a model of the solar system.) Why did von Däniken choose *not* to put a planet in the circle next to Uranus, which looked tailor-made to house a planet? (Answer: Then the "model" wouldn't fit right.)

And if space aliens really developed the solar system model, why is Pluto included? These days, because of its size, orbit, and origin, astronomers barely regard Pluto as a real planet. It retains that distinction out of tradition.

The hour-long program was filled with such problems.

On another artifact, an image of what appeared to be a snake became, in von Däniken's eyes, a light bulb filament. In another case, three lines of stones that formed a jagged line were, instead, magically converted into two equilateral triangles and a right-angle triangle—supposed proof that space aliens gave our ancestors geometry, trigonometry, and the Pythagorean theorem. The famous markings on the Nazca Plains in Peru were shown, with host Richard Karn (of the ABC comedy series *Home Improvement*) stating that "without the ability to fly, experts don't know how the Nazcans gained the perspective needed to create such elaborate figures on such a huge scale." Von Däniken and the folks at ABC are probably still wondering how the streets of New York City or Washington, D.C., could have been laid out so precisely when none of the engineers responsible had ever been in an airplane, or how hoaxers can create intricate crop circle patterns in the dead of night—best viewed from the air—without high-tech equipment.

The problem with such shows is that they are often produced by the network's entertainment division, where accuracy and fairness don't have a high priority.

But the "Chariots of the Gods?" special was followed by a *Turning Point* program on "Alternative Medicine: Hope or Hype?" that was produced by ABC News. It featured respected moderator Hugh Downs talking about therapeutic touch, hypnosis, iridology (the alleged ability to discern diseases by looking at the colored part of the eye), and ozone enemas.

The program was a mix of messages. While Downs cited several alternative medical methods and pointed out that "no medical studies have proven that any of these systems work," he also spoke of trying "unorthodox treatments with mind-boggling results."

It featured a patient of cardiac surgeon Mehmet Oz, of Columbia-Presbyterian Hospital in New York, who

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has decided to offer some of his patients a menu of techniques—hypnosis, Yoga, therapeutic touch—in an effort to see what works. Left unanswered was the question of how he's going to be able to tease out which discipline is beneficial and which is bogus if each patient is being given several types of treatments.

The show also profiled a former ABC News producer with breast cancer who decided not to have radiation treatments so she could, instead, follow the guidance of Park Avenue physician Dr. Nicholas J. Gonzalez. Gonzalez, according to the program, had her taking 134 nutritional supplement pills a day, performing two coffee enemas a day, and drinking glasses of Epsom salts, olive oil, and whipping cream every few weeks. Gonzalez freely acknowledged that there were no scientific studies to back up his regimen.

Downs and ABC didn't seem particularly alarmed by all this, approaching the story with sometimes-bemused curiosity and making it sound like we'll soon know whether this stuff works.

But from the consumer's point of view, there's a big difference between a medical treatment where the scientific evidence is not yet in, and one where tests have been conducted and the results show that the treatment is bogus.

ABC repeatedly failed to make that distinction.

Take iridology, for example. The network pointed out that there was no proof that iridology worked. That's true. But that's only half the truth. Iridology is not just unproven; it has been tested and shown to be bogus.

ABC also took a hands-off approach to reporting on therapeutic touch, neglecting to note that there are legitimate scientific reasons why doctors are skeptical. The program mentioned that the people who perform therapeutic touch claim to be able to massage and mold an invisible energy field into a healthier shape. But in order for therapeutic touch to work, (1) an energy aura must exist around the human body, (2) practitioners must be able to sense it, (3) the aura must be malleable by human hands, and (4) changes in the shape of the aura must translate into effects on the health of the body.

Downs and his ABC team neglected to note that nobody's been able to prove that the field exists, never mind that it's malleable. (Therapeutic touch promoters try to counter with the argument that the field has been photographed using Kirlian photography, which supposedly captures energy around living things. They usually have trouble responding if someone asks, in turn, why energy auras have been seen around Kirlian photographs of inanimate objects like paper clips.)

The network boasts that "more Americans get their news from ABC." But if news means giving viewers the whole story, this was one night when ABC did a disservice to its audience.

* * *

When the country's best known psychic, Jeane Dixon, died of a heart attack January 25 at the age of 79, it was disappointing to see that the media based their obituaries more on her legend than on the facts.

Dixon became famous for predicting the assassination of President John F. Kennedy. Yet hers was a forecast that nobody has been able to document.

Various obituaries made reference to a 1956 article in *Parade* magazine in which she supposedly said that a tall, young, blue-eyed, Democratic president elected in 1960 would die in office.

Actually, the May 13, 1956, article in *Parade* said, "Mrs. Dixon thinks (the 1960 election) will be dominated by labor and won by a Democrat. But he will be assassinated or die in office, 'although not necessarily in his first term.'" As Terence Hines noted in *Pseudoscience and the Paranormal* (Prometheus Books, 1988, p. 43), her prediction covers a lot of possibilities. In fact, she predicted in a 1960 forecast that "John F. Kennedy would fail to win the presidency."

Nonetheless, virtually every obituary gave her far more credit than her actual forecast deserved. *USA Today*, in its January 27 edition, bluntly stated that "her prediction that President John F. Kennedy would die in office came true."

Most news outlets tempered their stories by mentioning a few of her mistakes, most notably her forecast that the Soviet Union would beat the United States to the moon and that World War III would begin in 1958. Unfortunately, the "sometimes she was right, but sometimes she was wrong" attitude doesn't cut it. Because nobody expects a psychic to be perfect, the failed forecasts may have simply reinforced the idea in the minds of some that her gifts were real.

In fact, Dixon seldom made a real forecast. She was the queen of equivocation. Her predictions in the supermarket tabloid the *Star* were so full of ifs, coulds, and mights, she almost always had an excuse if a prediction failed to come true.

Consider, for example, her predictions for last year: "This winter, Nelson Mandela faces a personal crisis—and danger *could* return in April. His former wife Winnie *could* win an election and be returned to government (*Star*, January 9, 1996, emphasis added). For 1997, she said, "Late October *could* bring another plane tragedy over water," "Roseanne is headed for big health problems *if* she doesn't slow down," and "A temptress or even a female assassin *could* be waiting for President Clinton on a foreign trip. His best defense to ward off trouble will be to bring along his wife Hillary" (*Star*, January 7, 1997, emphasis added).

She also could be extraordinarily vague. The February 11, 1997, issue of the *Star*, which carried an eight-page tribute to her, had to stretch to find seventeen "amazingly accurate" predictions. The magazine gave her credit for forecasting the March 24, 1989, Exxon Valdez oil spill because she reportedly said, "A shipping accident will make headlines in the spring." The tabloid gave her credit for predicting the AIDS epidemic, which surfaced in the early 1980s, because she said, in 1978, that "a dreadful plague will strike down thousands of people in this country."

On the unusual occasion when she made an unequivocal prediction for an unexpected event that would be guaranteed to make news, her forecasts nearly always flopped. In the 1995 issue of the *Star*, she said it would be the year "Pope John Paul II will have a hand in liberat-

ing Cuba from Castro" and "a whole new world of dinosaurs will be discovered in Central Asia."

With Dixon's death, members of the media had a chance to set the record straight about a woman whose name had become a household word, largely on the basis of a myth. By and large, they missed the opportunity.

* * *

Three issues ago (November/December 1996), I rated how four CD-ROM encyclopedias—*Microsoft Encarta, The Grolier Multimedia Encyclopedia, Compton's Interactive Encyclopedia*, and *Encyclopaedia Britannica*—handle pseudoscience topics. My conclusion: Only Grolier did a reasonably responsible job covering the supernatural, rating 19 points out of a possible high of 56 on a scale that assessed the quality and quantity of the skepticism. *Britannica, Encarta*, and *Compton's* scored in negative numbers.

Since then, IBM has released the *1997 World Book Multimedia Encyclopedia* (Windows, $50), and the good news is that it scores even higher than Grolier, garnering 21 points on the scale. From astrology to UFOs, when it covers pseudoscience topics, it often does so in a way to give readers some idea why there is reason for skepticism.

Part of the reason for the high score may be that CSICOP fellows James Oberg and James Alcock contributed to the sections on UFOs and parapsychology, respectively. But other topics reflect a similarly skeptical viewpoint.

While the article on astrology says that "people declare there is no scientific basis for astrology" (it's not clear who these "people" are or why their declaration should carry any weight), the article goes on to note that discoveries made by Copernicus and Tycho Brahe conflict with astrology, and that the constellations have shifted over the past two thousand years to the point where most astrologers don't even know a person's true sun sign.

The entry on creationism, although brief, is one of the best I've seen. Although it doesn't get into specifics, *World Book* makes it clear that the debate is actually a religious battle over biblical literalism.

The Bigfoot and abominable snowman sections note that scientists believe some evidence, including footprints, have been faked and that the sun can often melt footprints in the snow, making them appear unnaturally large.

None of the encyclopedias scored well on the topic of homeopathy, and *World Book* missed the biggest criticism of this "alternative" medical system—that its medicines are so diluted, no active ingredient may even be present.

But overall, it's nice to see that Grolier isn't alone in giving a rational, scientific assessment of topics that the public finds so fascinating. □

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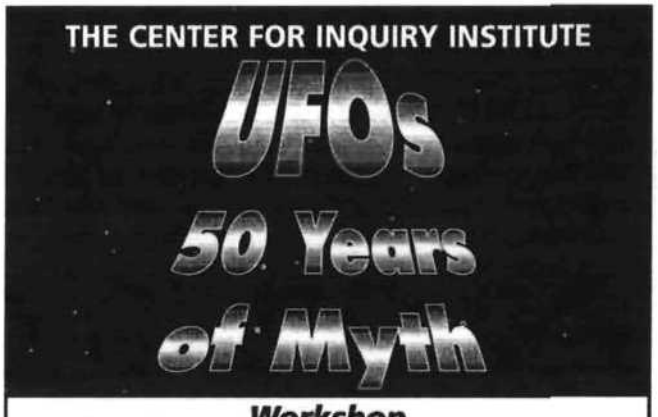

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Psychic Departures and a Discovery Institute

H. Alonso Alvarez de Araya

The well-known "psychic" Jeane Dixon, who supposedly had a "Gift of Prophecy," died suddenly of a heart attack in her home in Washington, D.C., on January 25 at age seventy-nine. Only three weeks earlier, the tabloid the *Star* carried what was to become her last set of annual "psychic predictions" for the New Year. It is interesting that in them she gave absolutely *no indication* that this year's predictions would be her last.

As I write this, the year 1997 is only a few months old, yet already Dixon's predictions are, as usual, looking rather bad. Right at the top, Dixon predicted "Cos blows his top—Somebody will get under Bill Cosby's skin and a very high-level person is going to be fired or a relative could be turned out of the house." What she failed to foresee was that Bill Cosby's son would be murdered, and that far from "blowing his top," the self-control that Cosby displayed in handling the tragedy could serve as a splendid example for everyone. The comedienne Ellen DeGeneres was supposed to have a run-in with the Secret Service or "a burly fan" while sneaking about the Clinton inaugural festivities, and depart Washington posthaste. If this happened, the news media did not report it. Dixon included a section of predictions about world leaders but failed to foresee that the leader of China, Deng Xiaoping, would die. We will just have to wait until the end of 1997 to evaluate the remainder of Jeane Dixon's final annual predictions. If she was correct, by the year's end "a grape-based diet will show remarkable results against several common illnesses" and "chess clubs in inner cities will boost academic *performance.*"

Another megastar of the psychic realm who recently passed to a higher plane was Thelma S. Ross, who died in February, also at age seventy-nine. An actress and screenwriter, Ross also taught medical psychology at UCLA from 1966 to 1979. She was best known for her work in Kirlian photography of the human aura and boasted of earning the Douglass Dean Award from the United Nations for her accomplishments in bringing that advanced form of Soviet technology to the United States. She also served as a consultant to several major motion pictures including *The Exorcist, Poltergeist,* and *Ghost.* She con-

PSYCHIC VIBRATIONS
continued on page 65

Is the Sky Falling?

A scientific consensus agrees that cosmic impacts have played a major role in Earth history and that they continue to pose a significant threat today. But there is a tremendous difference in the estimated dangers, stretching up to, or even over, the line that separates legitimate science from pseudoscience. Ten recent trade books are reviewed that span a broad range in interpretations.

DAVID MORRISON

As the millennium approaches, the media are playing up asteroid and comet impacts. Ten popular-level books were published in 1995 and 1996 dealing with the dangers of cosmic impacts, and now we are seeing a spate of television and movie productions, both factual and fictional, that describe the impact threat. It is easy to dismiss all this as media hype and millennial madness, but it would be a mistake to do so. While some books and films may be motivated by a desire to milk public credulity for a quick buck, most are serious efforts to inform the public about a real danger that is recognized by the scientific community. In this article, I summarize the background for the recent interest in impact catastrophes and then provide a comparative review of the current trade books that deal with this topic.

Background

Most scientists first thought about the role of impacts in Earth history in response to the now-famous paper published in *Science* in 1981 by Luis and Walter Alvarez and their colleagues, suggesting that an impact sixty-five million years ago produced the mass extinction that terminated the Cretaceous era. What was new in this paper was not the fact that Earth was struck by cosmic debris, but the idea that even relatively modest impacts might have a catastrophic effect on the environment. That Earth is subject to impacts is obvious from an examination of the cratered surface of our companion in space, the Moon. Planetary probes, beginning in 1964 with Mariner 4, have demonstrated that impact cratering is a universal process in the solar system. A heavy bombardment occurred early in planetary history, but it did not end then; a lower-level "rain of rocks" continues today, as comets and asteroids occasionally intersect the orbits of the planets. Those that come close and can pose a danger to Earth are collectively called Near-Earth Objects, or NEOs. On average, Earth should still expect to be struck by a fifteen-kilometer NEO every hundred million years or so. But the Alvarez paper and the research it stimulated also show that such impacts generate global-scale wildfires and dust storms, and thus are capable of killing most life forms and profoundly influencing the course of biological evolution. Impacts are the ultimate environmental disasters, more important than volcanic eruptions or other more familiar events in shaping the history of life on the planet.

Fortunately for us, impacts large enough to produce mass extinctions are rare, taking place at average intervals of tens of millions of years. However, there is a spectrum of comet and asteroid sizes, with many more small impacts than large ones. Based on what we know today, impacts much larger than the Cretaceous-Tertiary (K-T) event are possible in the future (although very improbable). And impacts smaller than the K-T event—say by objects one kilometer or a few kilometers in diameter—occur much more frequently. The planet is struck by a one-kilometer asteroid or comet at average intervals of about 100,000 years.

Another important aspect of these impacts is that they are, as far as we know, randomly distributed in time. The chances are equal that a big one could hit in 1997 or in 2248 or in any given year in the far future. Further, although a few teams of astronomers have been searching for NEOs, the census of these objects is far from complete. For instance, of the roughly two thousand kilometer-scale asteroids that are expected in Earth-crossing orbits, fewer than two hundred have actually been found. We are confident that Earth will not be struck in the foreseeable future by any of the known objects, but we can say nothing about the 90 percent that are not yet discovered. It is because we have not yet carried out a comprehensive search that we must speak in terms of probabilities. In reality, this is not a game of chance. There either is or is not an NEO out there aimed to hit us next year or in the next century. But we don't know about it yet.

Finally, we should realize that only a small fraction of the space around Earth is being monitored today and that the most probable warning for a kilometer-scale impact is zero—the first we would likely know of a strike is when we feel the ground shake and watch the fireball rising above the horizon. While several national and international observing programs have been proposed to accelerate the discovery of threatening objects, so far no government funds have been spent to deal with large-scale searches or any other efforts to mitigate the impact threat. There has been much talk, but little action beyond the efforts of a few individuals in the scientific and military communities.

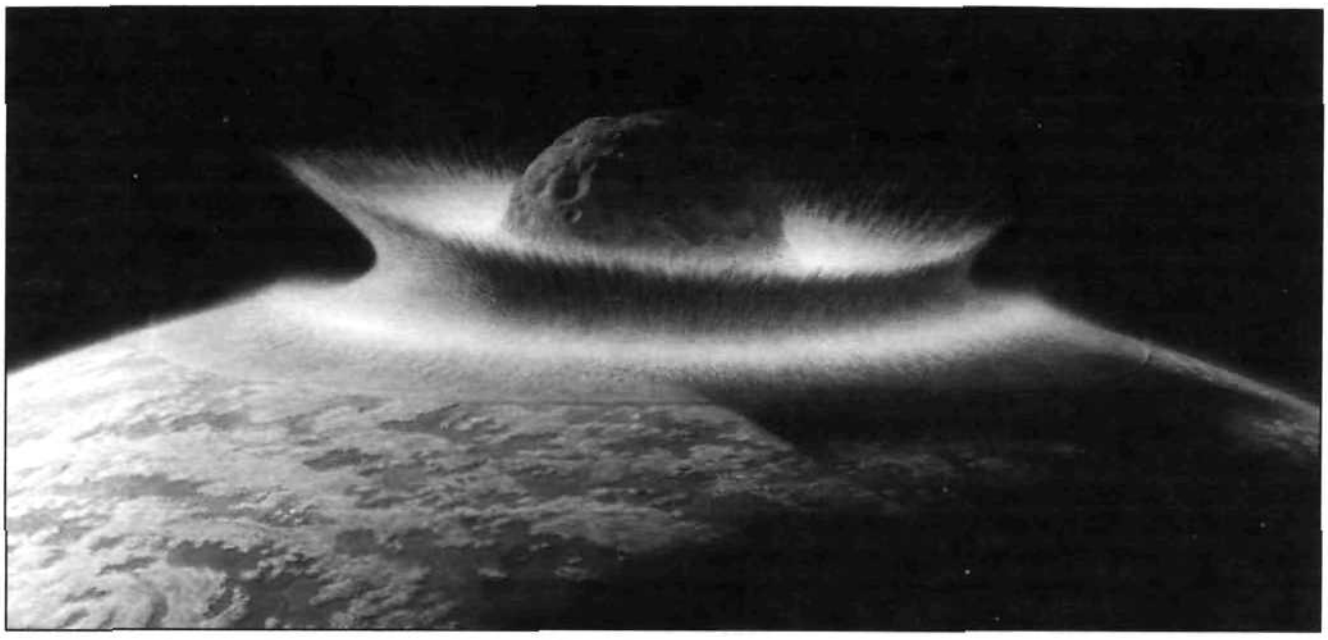
Fortunately for us, impacts large enough to produce mass extinctions are rare, taking place at average intervals of tens of millions of years.

Current Issues

Most of the books and TV specials deal broadly with the issues described above, including graphic descriptions of the destructive potential of impacts of various sizes and impact energies. The catastrophic climate changes that caused the death of the dinosaurs and other species at the end of the Cretaceous era are fascinating to scientists and laypersons alike. Another common element is the description of the 1994 collision of some twenty-three fragments of Comet Shoemaker-Levy 9 with Jupiter. This remarkable event, observed by hundreds of telescopes on Earth and in space, provided direct data on the nature and consequences of cosmic impacts. But a number of questions arise when we discuss the contemporary impact danger and consider whether—and how—to protect ourselves against future catastrophes. There is a considerable divergence among scientists in how such issues are framed and discussed, and an even wider disparity on the way these issues are presented to the public.

Let us begin with what I call the "standard paradigm"—that of random impacts on Earth by small comets and asteroids. This is the consensus view of most scientists, and it is reflected in two NASA reports to the U.S. Congress, the *Spaceguard Survey Report* of 1992 and the follow-up report in 1995 inspired by public interest in the collision of Shoemaker-Levy 9 with Jupiter. As the principal author of the *Spaceguard Survey Report* and a member of the follow-up working group (chaired by Gene Shoemaker), I identify with this consensus position.

Planetary astronomer and CSICOP fellow David Morrison is Director of Space at the NASA Ames Research Center. He was among the first to publish research on the contemporary impact hazard, and he chaired the congressionally mandated 1992 NASA study of ways to carry out a comprehensive survey of potentially threatening comets and asteroids.



Artist's concept of a catastrophic asteroid impact with Earth. Life near the impact would be instantly wiped out from the effects of high temperatures and pressures. Injection of huge masses of dust (and gases) into the atmosphere would effectively block out sunlight for long periods of time to the point that most life could not be sustained ("Nuclear Winter"). Painting by Don Davis, courtesy of NASA.

The standard paradigm uses the cratering history of the Moon and other evidence to deduce the average historical rate of impacts on Earth by objects of different sizes or impact energies. It then assesses the destructive potential of impacts of different energies on Earth today in terms of probable casualties, noting in particular the existence of a threshold at about one million megatons of energy (corresponding to a two-kilometer asteroid) at which the global climate is severely affected and everyone is at risk, independent of proximity to the impact. One conclusion of such studies is that the statistical risk is greatest for impacts near the global threshold, amounting to an average risk of death for each individual on Earth of nearly one in a million per year, comparable to the risk of other more frequent (but less catastrophic) events such as earthquakes, severe storms, and volcanic eruptions. It is also noted that, unlike other natural disasters, impacts can be avoided entirely by deflecting an incoming object, if several years warning time is available.

Although most people agree that the greatest risk is posed by objects two kilometers or larger in diameter, others focus their attention on smaller impactors, especially those in the 200- to 500-meter range. When impacts of this size occur in the ocean, they produce tsunamis capable of inundating large stretches of coastline. Although the average risk for inhabitants of the planet is less from tsunamis than from the global catastrophes caused by larger impacts, the risk for persons living on shorelines may be greater. This fact, together with the higher frequency of smaller impacts, leads some to argue that we need a defense system against any object larger than 200 meters diameter.

A major divergence of opinion concerns what our response to the impact threat should be. Most of the scientists involved in such assessments conclude that there is a significant risk and that governments should take some action (especially in searching for potential impactors), but that it is premature to build any defense systems in the absence of a specific identified threat. Others, the best known being Edward Teller (the father of the H-bomb), argue strongly for a more aggressive approach to asteroid defense. They would initiate experiments, eventually to include nuclear explosives, designed to learn more about how to deflect or destroy asteroids and comets. Some even advocate construction of a standing nuclear defense system to deal with the smaller impactors, for which the warning time might be short. But at least, they assert, we should start now to develop the technology for such a system.

These arguments concerning the magnitude of the threat and the most appropriate response make good TV and newspaper copy. They can lead to serious analyses of the various threats that we face on Earth and of the role of governments in dealing with potential disasters, both natural and human. All fit within the standard paradigm. But there is another viewpoint, held by a handful of British neo-catastrophists, that challenges this position.

The British Neo-Catastrophist School

The alternative viewpoint is advocated in its extreme form by astronomers Victor Clube and Bill Napier, who interpret historical records as indicating that Earth has been subject to extreme battering from space within the past few millennia. In their popular books *The Cosmic Serpent* and *The Cosmic Winter*, they take the position that the emergence of astrology in the western Mediterranean, the association of gods with planets in many ancient cultures, the widespread fear of comets and belief in angels, and many other aspects of our cultural and religious history are a reflection of massive bom-

bardment of the planet a few thousand years ago. They further conclude that more recent historical events, including the collapse of the Roman Empire, the Dark Ages, and even the English Civil War, are related to climate changes induced by exceptional deposition of cosmic dust in Earth's atmosphere. Although their historical analysis is suspiciously similar to that of Immanuel Velikovsky, Clube and Napier adamantly reject the association, arguing that unlike Velikovsky they root their explanations in sound physical and astronomical principles.

Supporting Clube and Napier are British astronomers Duncan Steel and Mark Bailey, who have concluded that the solar system is currently experiencing the aftermath of the break-up of a giant comet some millennia in the past. Our planet still intersects debris from this comet in what they call the Taurid complex of dust, small comets, and asteroids. They term this theory *coherent catastrophism*. Steel and Bailey estimate that the present lull in impacts will end in about a thousand years, when our orbit again crosses the denser parts of the Taurid complex, at which time the impact risk will rise by at least a factor of a hundred. All of these neo-catastrophists argue that urgent action is required to prevent the collapse of civilization under the next cosmic onslaught.

Most of us find these neo-catastrophist arguments difficult to swallow. Putting aside the issue of the Velikovskian interpretation of history and legend, the impact rate is still constrained by the cratering history of the Moon, which reflects the long-term average. If there are huge "spikes" in the frequency of impacts, produced by the break-up of giant comets, they must be compensated by much lower flux rates between peaks. Yet Clube, Steel, and their colleagues simultaneously assert that the consensus group underestimates the current impact rate, and that a big spike is coming. You can't have it both ways. If they are correct that almost all impacts occur during the spikes, then the present danger must be very low, and we have centuries to prepare to deal with the next peak. But they don't see it that way, and neither do the authors of several of the recent books.

Impact Science and Pseudoscience

While I believe that the British neo-catastrophists are wrong about the threat to Earth, their work is science, not pseudoscience. They are making their case to other scientists, and time will sort out who is right and who is wrong. They do, however, sometimes attract the attention of fringe elements. For example, the Society for Interdisciplinary Studies (SIS), a British group that espouses a skeptical philosophy but includes many defenders of Velikovskian ideas, is sponsoring a conference that features Clube and focuses on evidence for cosmic catastrophes in the ancient world. In fact, the work of Clube and Napier attracts many people who were once impressed by Velikovsky, such as Leroy Ellenberger, at one time a member of the Velikovsky inner circle and now one of the most outspoken critics of his current followers.

Every week I receive two or three inquiries from the public asking if some story they have read or heard about an imminent world-shattering impact is correct. These stories are not confined to the supermarket tabloids but have apparently attracted a following on the World Wide Web. Some people ask about a comet called Wormwood, with obvious reference to the apocalyptic vision in Revelation 8:10–11, when "the third angel sounded, and there fell a great star from heaven, burning as it were a lamp. . . . And the name of the star is called Wormwood."

Most of the scientists involved . . . conclude that there is a significant risk and that governments should take some action.

Then there is Comet Hale-Bopp. In November 1996 the press gave general coverage to a wild claim that this comet was accompanied by a spaceship and was headed toward an impact with Earth. (See Alan Hale, "Hale-Bopp Comet Madness," *SI*, March/April 1997.) The story apparently started when an amateur astronomer photographed the comet near a moderately bright star. In a curious logical progression he assumed the star was a spacecraft, that the spacecraft was at the same distance as the comet, and that the over-exposed stellar image represented the angular diameter of the craft, which would make it comparable in size to the giant planet Saturn. Others embellished the story by concluding that the spacecraft was traveling in the same orbit with the comet and that the trajectory was about to shift toward Earth. The mystery to me is why this fantasy was given serious media attention, even on a slow news day. I fear that we may see more of this sort of thing as the public becomes more aware of the threat of impacts.

Presenting the Issues to the Public

Of the ten books reviewed here, three are strongly in the Clube/Steel camp, and several of the others give their neo-catastrophism considerable attention. This is perhaps understandable, since these are the scientists who are most strongly claiming that the sky is falling. Besides, the connections they make between impacts and the more familiar fields of history and religion have an obvious public appeal.

In contrast, the public policy issues surrounding the development of a space defense system and the possible testing of nuclear explosives in space are barely touched on in most of these books. In part, this represents the secretive nature of the defense scientists, who (unlike the more gregarious astronomers) tend to avoid talking with journalists or appearing in TV documentaries. But the issues are real, and the first steps toward an asteroid defense are being initiated by the Pentagon's just-approved Clementine 2 space mission to intercept three near-Earth asteroids and fire high-speed projectiles into their surfaces. It would be more useful if these policy questions, rather than the idea that cosmic dust caused the English Civil War, were being prominently addressed in pub-

lic discussion of the impact threat.

On the positive side, the impact issue is proving to be an excellent vehicle for communicating some interesting aspects of contemporary science to the public. The topic, bringing together astronomy, environmental threats, and dinosaurs, is a natural. It focuses on the way historical science works (how can we figure out what really made the dinosaurs go extinct?), on the fragility of the environment (how can one small impact have global consequences?), on the nature of evolution (why were the mammals who succeeded the dinosaurs so different from them?), and on the nature of probability (if big impacts take place only once every million years, why worry now?). There is great potential here to teach good science as well as stimulate a useful public policy debate. Let's hope these lofty goals are achieved in practice.

The Standard Reference on Impacts

In January 1993 more than one hundred experts met in Tucson, Arizona, to discuss all aspects of NEO impacts, from the extinction of the dinosaurs to the nature of impact-induced tsunamis to the deflection of an incoming asteroid by nuclear explosions. A wide spectrum of opinion was represented, as exemplified by the appearance of old antagonists Carl Sagan and Edward Teller on the same platform. In 1994 the edited, refereed product of this meeting was published by the University of Arizona Press, edited by Tom Gehrels, as *Hazards Due to Comets and Asteroids*. This 1,300-page book, with 120 authors, is the definitive reference on the impact hazard. Indeed, is it the only published source for much of the work, which has not appeared in technical journals. This is the best place to find detailed information on the subject, but more current reports are also on the World Wide Web at the Asteroid and Comet Impact Hazard Homepage (http://impact.arc.nasa.gov).

Books That Represent the Standard Paradigm

The following five books adhere generally to the standard view of the NEO impact threat, as represented in the NASA reports and the refereed conference volume *Hazards Due to Comets and Asteroids*.

John S. Lewis. *Rain of Iron and Ice: The Very Real Threat of Comet and Asteroid Bombardment.* Addison-Wesley, 1996, 236 pp., $25.00. John Lewis, professor of planetary science at the University of Arizona and one of the leading proponents of the use of asteroid resources for long-term space development, has written the best popular volume on the impact hazard. This book is written primarily for the scientifically literate lay audience, but it contains a great deal of information—and no small number of pointed barbs—directed toward scientific colleagues who study NEOs professionally. Lewis covers all the relevant issues of the nature of NEOs, the impact history of the solar system, the impact hazard, and mitigation. His writing style is compact, clear, and comprehensive.

In addition to his solid coverage of the basics, Lewis probes in depth three areas that are often missing in other treatments. (1) He clearly places Earth impacts in their broader solar-system context, with extensive discussion of the lessons learned from the cratering histories of the Moon, Mercury, and Venus. (2) He places strong emphasis on the long history of eyewitness reports of terrestrial bolides, meteorite showers, and atmospheric detonations, many of which have done considerable damage. This evidence, he stresses, is overlooked by most workers in the field. (3) He uses current models of the impact flux and the entry physics for impactors to "reconstruct" ten different one-century scenarios, with specific details of individual impacts and their damage, as a way to illustrate the variety of impact events. This same list allows Lewis to address the question of which scenarios (had they happened in the twentieth century) would likely have led to a widespread appreciation of the impact hazard and which scenarios probably would have been ignored or misinterpreted. The real history of the twentieth century is intermediate; Lewis argues that had the circumstances of the 1908 explosion of a 60-meter asteroid in the atmosphere over Siberia's Stony Tunguska River been just a little different, we might never have known about it and foolishly continued to ignore the impact hazard up to the end of the century. (The Tunguska explosion flattened 2,000 square kilometers of forest and created a pressure wave recorded around the world.) This is the best introduction to the field, standing far above any of its competitors.

Dana Desonie. *Cosmic Collisions.* Henry Holt & Co. (A Scientific American Focus Book), 1996, 128 pp., $9.95. The Scientific American Focus Books are inexpensive paperbacks aimed at an intermediate or high school audience. Dana Desonie is a science writer with a doctorate in geochemistry. Her short, well-illustrated (in black and white) book is a straightforward introduction to cosmic impacts, beginning with solar-system formation, moving to comets and asteroids, then to Earth impacts (including the K-T event), Tunguska, current ideas about the impact hazard, and possible planetary defense. This is a serious, well-focused discussion that includes a lot of information in a book that can be read in a couple of hours.

David H. Levy. *Impact Jupiter: The Crash of Comet Shoemaker-Levy 9.* Plenum Press, 1995, 290 pp., $25.95. In this delightful memoir, writer and amateur astronomer David Levy provides a personal perspective on the history of Comet Shoemaker-Levy 9, from its discovery in the spring of 1993 until its death in July 1994. Writing for a lay audience, Levy tells with infectious enthusiasm of his adventures and those of many colleagues dealing with both the comet itself and the barrage of journalistic scrutiny it inspired. Only a few chapters concern the impact hazard, and defense issues are hardly mentioned, but Levy's technical explanations are simple and clear. This is not a detailed reference work, and its real pleasure lies less in the science than in the many personal stories and the sense of involvement achieved by the diary-like presentation of events.

John Spencer and Jacqueline Mitton, editors. *The Great Comet Crash: The Impact of Comet Shoemaker-Levy 9 on Jupiter*. Cambridge University Press, 1995, 118 pp. John Spencer is a scientist at Lowell Observatory and an expert on Jupiter and its satellites; Jacqueline Mitton is a writer and Public Information Officer of the Royal Astronomical Society. They have collaborated to produce a timely and well-edited volume on the great comet impact, with chapters contributed by many of the leading researchers in their fields. Of all the books discussed here, this one has by far the best photographs, intelligently selected and beautifully reproduced. Only about a quarter of the book deals with the impact hazard, but these few chapters are by the experts and provide an excellent overview.

Philip M. Dauber and Richard A. Muller. *The Three Big Bangs: Comet Crashes, Exploding Stars, and the Creation of the Universe*. Addison-Wesley, 1996, 207 pp., $25.00. The first third (about seventy-five pages) of this popular-level book on modern astronomy is devoted to NEO impacts (and not just comets, as the title implies). The authors are physicists from the University of California at Berkeley, and Muller is one of the originators of the Nemesis hypothesis to explain periodicities in the terrestrial extinction record. Given the limited space available and the nonscientist audience toward which their book is aimed, Dauber and Muller do a good job of explaining the impact hazard story, with emphasis on the K-T extinction event and its lessons for the impact history of Earth. Both authors describe themselves as protégés of Luis Alvarez, and they are at their best in describing the events associated with the pioneering work that led to the identification of the extraterrestrial cause of the K-T event and the grand generalization of this evidence into a new theory of mass extinctions. In a few other areas, however, including discussions of the current hazard and of the *Spaceguard Survey* proposals, they oversimplify to the point of significant distortion. This book is a good read, but should be taken with quite a few grains of salt.

Books That Represent the British Neo-Catastrophist School

These three books by British authors all argue for a much higher level of danger from cosmic impacts and appeal to the record of the immediate past for evidence of the major role played by impacts in our history.

Duncan Steel. *Rogue Asteroids and Doomsday Comets: The Search for the Million Megaton Menace That Threatens Life on Earth*. Wiley, 1995, 308 pp., $24.95. Duncan Steel is well known in Australia and worldwide as a leader in NEO searches, a researcher on orbits of meteor streams, and a popularizer of the NEO impact risk. He writes well, and he covers all the issues of the nature of NEOs, the impact history of the solar system, the impact hazard, and mitigation. Roughly the first half of the book is on a par with Lewis and can be recommended with equal enthusiasm. In many other places, however, Steel departs dramatically from the mainstream to advocate the extreme neo-catastrophist position; in some places he admits that his positions are unorthodox or even bizarre, but elsewhere he neglects to make this distinction. Steel feels that the cratering flux is highly time-variable and states that "we are now fairly certain that terrestrial craters are, up to a large extent, formed during distinct periods of higher impactor flux." In dynamics, he espouses the radical idea that "the main [asteroid] belt is not being depleted to supply meteorites and Earth-crossing asteroids, but quite the opposite." He includes a highly personal chapter on the neo-catastrophist interpretation of Stonehenge that was characterized in another review (in *Sky & Telescope*) as "fiction, not even science fiction." Perhaps some of these unorthodox ideas are deserving of serious scientific discussion, but their inclusion as fact in a popular-level book detracts significantly from its overall value, since the nonscientist reader has no way of separating the speculation from reliable information.

Gerrit L. Verschuur. *Impact: The Threat of Comets and Asteroids*. Oxford University Press, 1996, 237 pp., $25.00. Gerrit Verschuur, a well-known radio astronomer, educator, and author, presents a detailed (and very small print) discussion that lays out the full impact story. Throughout the book, Verschuur emphasizes data and interpretations that maximize the impact flux as well as the damage that can be done by impactors of a given yield. Since there are substantial uncertainties in many of these estimates, it is possible, by always selecting the worst case, to conclude that the danger is orders of magnitude greater than the values usually quoted. This is the tack taken by Verschuur, in general agreement with the arguments in Steel's book reviewed above. Verschuur's writing style is clear and witty, and I would happily recommend the first ninety-four pages. However, I cannot agree with the increasingly alarmist interpretations that dominate the book after page 95, on which Verschuur first introduces Clube and Napier. He argues that the "patterns in history" they have found should be the basis for policy decisions on protecting Earth from cosmic impacts, which he concludes produce worldwide flooding from asteroid impact every five thousand years or so. He writes that "we are perpetually poised on the edge of extinction and have been very lucky to get this far," and "[t]he number of casualties resulting from an ocean impact . . . may be 10,000 times larger than given by Chapman and Morrison [in a 1994 paper in *Nature*]." In general, this book compares well with Steel's, but with the same fatal flaw (from my perspective) of its emphasis on coherent catastrophism, and an even worse tendency to exaggerate the current impact hazard, often by several orders of magnitude.

John and Mary Gribbin. *Fire on Earth: Doomsday, Dinosaurs, and Humankind*. St. Martin's Press, 1996, 264 pp., $23.95. British science writers John and Mary Gribbin have written a general overview of impacts and impact dangers for the lay public. Printed in large type and presented without illustrations, the book is significantly shorter than the two

reviewed above, in spite of its similar page count. In essence, this book is a popularization of suggestions by Clube and Napier that human history has been greatly influenced by cosmic apparitions and cosmic impacts. They anticipate that "the world is in for another bout of fire from the heavens in about a thousand years' time." This is a pretty grim picture; hence their title, which literally refers to fires that may sweep Earth a few centuries in the future. The book contains a number of factual errors, but the main problem is that everything is slanted toward maximizing the impact flux and the associated danger. They assert that impact-associated atmospheric dust has been responsible for the recent ice ages, and that the climate of Earth today "rests on a knife edge," ready to drop into another ice age with the smallest cosmic perturbation (no worry about global warming here!). This is a well-written book, but basically it adds little that is new. It seems to me that if one wants to explore the ideas of the British neo-catastrophist school, then one might just as well skip Gribbin and Gribbin and turn directly to the primary sources, in books by Clube and Napier and by Steel.

Unacceptable Books

The following two books should never have been published. The authors seem to be covering the field, but when you look in detail you find error and inconsistency on almost every page.

Patricia Barnes-Svarney. *Asteroid: Earth Destroyer or New Frontier?* Plenum Press, 1996, 292 pp., $25.95. Science writer and educator Patricia Barnes-Svarney has written an extremely frustrating book. She has attempted the ambitious task of covering for a lay audience the entire field of asteroid and comet studies, impacts, solar-system history, the hazard of Earth impacts, and the use of asteroids as space resources. Unfortunately, she is out of her depth in most of these areas, leading her repeatedly into conceptual and technical errors.

Barnes-Svarney loves technical jargon, mining the fields of astronomy, geology, and meteoritics for their numerous terms and then going on to invent a few of her own. Throughout the book she undercuts her own conclusions with words such as *perhaps, seems,* and *probably* even when she is reporting simple facts, as in the extreme example (p. 241) where she writes, "Right now, the best guess seems to be that there is no asteroid or comet known to be on an immediate collision course with the Earth."

There is a lot of information in the book, but frequently it is presented as isolated "factoids," rather than integrated into a self-consistent whole. For example, the author quotes half a dozen different values for the current terrestrial impact flux, but each in different units, so one cannot readily compare the results. Too often she gets things entirely backwards, as in her statement (p. 240), "Space scientists will tell you that everything within budgetary reason is now being done to search for more near-Earth asteroids." I can't imagine any of the current observers, all of them starved for support, making such a statement. Barnes-Svarney also has some unusual opinions about NEO impacts. Although she writes at length about the K-T impact, she does not believe it played a role in the extinction of the dinosaurs; and even for other species, the most she says is that this impact is "thought to have helped in the Cretaceous-Tertiary extinctions." Yet she credits impacts in the past with initiating plate tectonics, triggering volcanism, and generating Earth's magnetic field—all highly dubious assertions. The book is especially weak in all things quantitative, riddled with inconsistencies and often misquoting sources.

Donald W. Cox and James H. Chestek. *Doomsday Asteroid: Can We Survive?* Prometheus Books, 1996, 338 pp., $26.95. The authors, popular science writer Don Cox and retired aerospace engineer James Chestek, have written about the impact hazard in the context of an argument for expanded human activity in space, including a major effort to visit the asteroids, colonize them, and mine them for space resources. Most of the factual material is from secondary sources such as *Science News* and the *New York Times*. The authors have obviously not attended any of the technical meetings on impacts held during the 1990s, and they do not understand many of the technical issues. From the beginning they tell us that the asteroids are most likely the result of an exploded planet, an idea that has had no scientific support for nearly fifty years. But this does not inhibit them from passing harsh judgment on the various teams of scientists who have participated in framing the NEO issue during the past five years. A special target of Cox and Chestek is the 1992 NASA Spaceguard strategy to search for asteroids, which they compare with the drunk who searches for his keys under the street lamp instead of where he lost them. They completely miss the point of carrying out a search to discover the objects as they periodically come close to Earth, but long before they actually hit. The direction from which they make their final approach is irrelevant. Because of this misunderstanding, they devote most of their search chapter to a simplistic argument that many impacting asteroids approach Earth from the sunward side, and on this basis they insist that a space system, with telescopes far from Earth, is required. The tone of much of the book is bitter and negative, and the attitude of the authors toward the research community is captured in the following paragraph:

> An early warning space telescope certainly need not cost anywhere near as much money as the Hubble telescope. That was a research project, and many high-priced scientists and their graduate students spent many years charging their time to the project. Here we are discussing a simple early warning system, which the military knows how to build. The cost will only be for some engineering, not a lot of research, so it can be vastly cheaper.

The technical errors and widespread confusion displayed by Cox and Chestek in this book and by Patricia Barnes-Svarney her book reviewed above suggest that the filters against bad science writing for the public are not very effective. There seems to be no equivalent of peer review for science books, even at top publishers. *Caveat emptor.* □

Collective Delusions: A Skeptic's Guide

Collective delusions are an important topic for skeptics to address as they have the potential to influence millions of people.

ROBERT BARTHOLOMEW

The word *delusion* is used by psychiatrists to describe a persistent pathological belief associated with serious mental disturbance, usually psychosis. Sociologists and social psychologists use the term *collective delusion,* or *mass delusion,* in a different sense, to describe the spontaneous, temporary spread of false beliefs within a given population. Excluded from this definition are mistaken beliefs that occur in an organized or ritualistic manner. This term is also a common source of confusion since it is often used as a "catchall" category to describe a variety of different behaviors under one convenient heading. There are four common types of collective delusions: immediate community threats, community flight panics, symbolic community

Brad Marshall

scares, and collective wish-fulfillment. Being familiar with the processes involved in each, and recognizing their features, is the first line of defense to counteract their influence.

Mass delusions differ from prominent religious myths and popular folk beliefs in that they occur in an unorganized, spontaneous fashion, although they may become institutionalized. Examples of institutionalization include the incorporation of claims of widespread satanic-cult sacrifices into the teachings of church groups, or the formation of organizations intended to confirm the existence of alien visitors or Bigfoot.

History is replete with examples of group delusions, many of which may seem humorous to those outside the historical or cultural setting. For instance, in 1806 near Leeds, England, residents became terror-stricken, believing that the end of the world was imminent after a hen began laying eggs with the inscription "Christ is Coming." Masses thronged to glimpse the miraculous bird—until it was discovered that the eggs had been inscribed with a corrosive ink and forced back into its body. This is one of many examples from Charles Mackay's classic, *Memoirs of Extraordinary Popular Delusions and the Madness of Crowds* (1852). Unfortunately, the outcomes are often more sinister: Nazism, mass suicide, moral "witch-hunts," real witch-hunts, communist infiltration scares, the Crusades, and unfounded fears about the casual transmission of AIDS, to name but a few.

While historical episodes of collective folly are legendary, modern occurrences are remarkably similar. The four broad categories to be surveyed all involve a rapid spread of false, but plausible, exaggerated beliefs that gain credibility within a particular social and cultural context. They can be positive and take the form of wish-fulfillment, but are usually negative and spread by fear. Rumors are an essential ingredient common to each category of delusion. As persons attempt to confirm or dismiss the accuracy of these unsubstantiated stories of perceived importance, everyday objects, events, and circumstances that would ordinarily receive scant attention become the subject of extraordinary scrutiny. Ambiguous agents are soon redefined according to the emerging definition of the situation, creating a self-fulfilling prophecy. Many factors contribute to the spread of episodes: the mass media, low education levels, the fallibility of human perception, cultural superstitions and stereotypes, group conformity, and reinforcing actions by authority figures, such as politicians, or institutions of social control, such as military agencies.

Immediate Community Threats

These collective delusions involve exaggerated feelings of danger within communities at large, where members of the affected population are concerned over what is believed to be an immediate personal threat. Episodes usually persist from a few weeks to several months and often recur periodically. Participants may express excitement and concern, but they don't panic and take flight. The underlying causes of fantasy creation and spread are the fallibility of human perception and

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the tendency for persons sharing similar beliefs in group settings to yield to the majority consensus.

An example of an immediate community threat occurred in Sweden during 1946, when there were mass sightings of imaginary rockets flying across the sky. In conjunction with rare cometary debris entering the atmosphere, rumors were circulating that remote-controlled German V-rockets, confiscated by the Soviets at the close of World War II, were being test-fired as a form of political intimidation or a prelude to an invasion. The historical and political contexts were key factors in rendering the rumors plausible, as the episode occurred amid a long history of mistrust of the Soviets, including invasion fears, border disputes, and spy scandals, which had long preoccupied the Swedes for centuries. Public statements reinforcing the existence of the rockets were made by top Swedish military officials, politicians, scientists, police, and journalists. Convinced of their existence, many citizens began redefining cometary spray that was sporadically streaking across the sky as enemy rockets. Some even claimed to distinguish tail fins or a fuselage. Of 997 reports investigated by the Swedish military, including nearly 100 "crashes" in remote areas, not a single shred of evidence confirming their existence was found, despite the military's extreme measure of draining some lakes to search for evidence (Bartholomew 1993).

Occasionally, the feared agent is a mysterious attacker believed to be terrorizing a community. During a two-week period in 1956, nearly two dozen residents in Taipei, Taiwan, claimed to have been slashed by a man wielding a razor-blade-type object. Police later determined the episode to have been entirely psychological. In the wake of rumors, lacerations from such mundane sources as incidental paper cuts or bumping into an umbrella on a crowded bus were redefined (Jacobs 1965). Sometimes the imaginary threat is from an agent that is believed to cause illness, such as the series of phantom attacks in Mattoon, Illinois, during two weeks in 1944 involving a "mad gasser" (Johnson 1945). In Auckland, New Zealand, in 1973, fifty drums of the compound merphos were being unloaded at a wharf when it was noticed that several barrels were leaking, and a chemical-like smell permeated the air. After immediate requests for information on its toxicity, authorities were wrongly informed that it was extremely toxic, after which at least four hundred dock workers and nearby residents received treatment for a variety of psychosomatic complaints: headache, breathing difficulty, and eye irritation (McLeod 1975).

In non-Western settings, immediate community threats are closely associated with cultural traditions, as in the case of headhunting rumor-panics that have occurred for centuries in remote parts of Malaysia and Indonesia (Forth 1991; Barnes 1993). These episodes represent fears among "primitive" peoples of losing political control to a distant central government. Headhunting scares are characterized by sightings of head-takers and discoveries of their alleged paraphernalia. Just as the vast, ambiguous nighttime sky is an excellent catalyst for spawning UFO sightings, and lakes are conducive to sea-serpent reports, the thickly vegetated Southeast Asian jungle is ideal for misperceiving head-takers lurking in the myriad of foliage. Often villages are paralyzed with fear, travel is severely restricted, sentries are posted, and schools are closed for months. Most headhunting scares coincide with the nearby construction of a government bridge or building, during which it is widely believed that one or more human heads are required to produce a strong, enduring foundation. They are a projection of the state of tribal-state relations, reflecting "ideological warfare between the administrators and the administrated" (Drake 1989, 275).

Community Flight Panics

A second type of collective delusion is the community flight panic, where residents attempt to flee an imaginary threat. Episodes may last from a few hours to several days or weeks, subsiding when it is realized that the harmful agent did not materialize. Perhaps the best-known example is the panic that ensued in the United States on Halloween eve in 1938 following the realistic radio enactment of H. G. Wells's book *War of the Worlds* by the CBS Mercury Theater. In his book *The Invasion from Mars: A Study in the Psychology of Panic* (Cantril 1940), psychologist Hadley Cantril notes that in general, those panicking failed to exercise critical thinking, such as telephoning the police or checking other media sources. There remains a great potential for similar hoaxes to recur when they are presented with plausibility and a degree of realism for the participants. A similar broadcast in South America nearly a decade later had disastrous consequences. During 1949, in the vicinity of Quito, Ecuador, a radio play based upon the *War of the Worlds* resulted in tens of thousands of frantic residents pouring into the streets and fleeing for their lives, or preparing to defend themselves against Martian gas raids. Broadcast in Spanish, the program was highly realistic, including the name of a local community, Cotocallo, as the Martian landing site. The play included impersonations of politicians and vivid eyewitness descriptions. It was so convincing that police rushed to Cotocallo to repel the invaders. Quito was left with a skeleton police force that was unable to prevent an angry mob from burning down the building housing the radio station that broadcast the drama. Fifteen people were killed, including the event's mastermind.

Spontaneous mass flights from the city of London have occurred over the centuries in response to prophecies of its destruction by: a great flood in 1524, the Day of Judgment in 1736, and an earthquake in 1761 (Mackay 1852). One of many contemporary examples involving apocalyptic prophecies and mass panic occurred in Adelaide, Australia, in the month leading up to January 19, 1976. Many people fled the city and some even sold their homes after "psychic" John Nash predicted that an earthquake and tidal wave would strike at midday. Many of those who sold their homes or just left to the hills for the day were first generation Greeks and Italians—both Greece and Italy have a long history of devastating earthquakes, and belief in clairvoyants in those countries is generally taken very seriously (Bartholomew 1992).

Four Categories of Collective Delusions:

Immediate community threats

Community flight panics

Symbolic community scares

Collective wish-fulfillment

Symbolic Community Scares

Symbolic community scares typically endure in a waxing and waning fashion for years, encompassing entire countries and geographical regions. They involve less of an immediate concern for safety and welfare, and more of a general, long-term threat. They are primarily symbolic and rumor-driven, consisting of fear over the exaggerated erosion of traditional values. These moral panics are characterized by self-fulfilling stereotypes of ethnic minorities and deviants who are wrongfully indicted for evil deeds, having much in common with the infamous continental European witch persecutions of 1400 to 1650. In *Collective Behavior,* sociologist Erich Goode (1992) aptly summarizes these events, noting that they originated from the disintegration of the Roman Catholic Church during the late Middle Ages and early Renaissance. The feudal hierarchy was unraveling and peasants were migrating to cities. Scientific rationalism, with its secular philosophy, conflicted with church doctrine, and new religious denominations were being formed beyond the church's control. In an unconscious attempt to counteract secularism and reestablish traditional authority, the church-sponsored persecution of witches attempted to redefine moral boundaries, and church inquisitors focused on eradicating various deviants who were viewed as a threat.

Two prominent moral panics have persisted for the past decade. Scores of Western communities with predominantly Judeo-Christian traditions have experienced ongoing rumors about the existence of a network of satanic cults that kidnap and sacrifice children. These rumors coincide with the widespread perception of declining Western morality and traditional values. Under similar historical circumstances, subversion myths have appeared in which a particular alien group is believed to threaten the moral fabric of society. Common scapegoats include minority ethnic groups, Jews, Africans, communists, heretics, deviants, and the poor. Such myths flourish during periods of economic downturn and social unrest, and are characterized by dramatic, plausible rumors containing meaningful, timely morals or messages reflecting popular fears. During oral transmission, local details are substituted and a credible source is identified. Their function is primarily metaphorical. Victor (1990, 290) notes that the contemporary satanic-cult scare coincides with the disintegration of traditional family structures, which intensifies fears and the desire "to blame someone." Unlike scares involving imminent danger, subversion myths present a more generalized threat not only to people, but to a way of life (Hicks 1990, 387), as rumors and urban legends of local satanic cults function as cautionary cultural metaphors about the inability of the weakened family to protect children (Bromley 1989; Victor 1989). A similar symbolic process drives child sex-abuse panics that have appeared periodically in certain regions for decades (Cockburn 1990).

Collective Wish-Fulfillment

Mass wish-fulfillment involves processes similar to those that cause community threats and moral panics, except the object of interest is esteemed and satisfies psychological needs. Cases typically persist for a few weeks or months and recur periodically in clusters. Episodes involve a subconscious wish that is related to human mortality in conjunction with a plausible belief, fostering a collective quest for transcendence. Examples include Virgin Mary "appearances" (Yassa 1980; Persinger and Derr 1989), "moving" religious statues in Ireland (Toibin 1985), waves of claims and public discourse surrounding widespread reports of fairies in England before the twentieth century (Kirk 1812; Evans-Wentz 1909), and flying saucers worldwide since 1947 (Sheaffer 1981). These myths are supported by a spiritual void left by the ascendancy of rationalism and secular humanism. Within this context, and fostered by sensationalized documentaries, movies, and books, contemporary populations have been conditioned to scan the heavens for "UFOs," representing what Carl Jung (1959) termed "technological angels." These sightings serve as a projected Rorschach inkblot test of the collective psyche, underscoring the promise of rapid technological advancement during a period of spiritual decline.

Accounts of UFO occupants and fairies depict godlike beings capable of transcending natural laws and, thus, potentially elevating humans to their immortal realm. They reflect themes similar to those found in religion, mythology, and folklore throughout the world, camouflaged for contemporary acceptance (Bullard 1989). Transcendence and magical or supernatural powers are an underlying theme in most wish-fulfillments. Education builds resistance but does not provide immunity to what philosopher Paul Kurtz (1991) terms "the transcendental temptation." Even observations of imaginary and extinct creatures, such as Bigfoot and the Tasmanian "Tiger," respectively, once considered the sole domains of zoology, have undergone recent transformations with the emergence of a new motif among paranormal researchers that links extraterrestrial or paranormal themes with phantom animals (Clark and Coleman 1978; Healy and Cropper 1994). The existence of such animals can be viewed as an antiscientific symbol undermining secularism. Like claims of contact with UFOs or the Virgin Mary, evidence for the existence of Bigfoot and Tasmanian "Tigers" ultimately rests with eyewitness testimony, which is notoriously unreliable (Loftus 1979; Buckhout 1980; Ross et al. 1994).

A Note on Non-Western Delusions

Human gullibility is limited only by plausibility. This is especially apparent in non-Western countries where superstitions

are often rampant. For example, in some cultures it is widely believed that eating certain foods or having contact with "ghosts" can cause one's sex organs to rapidly shrivel. It is a remarkable example of the power of self-delusion that men in parts of Asia continue to experience "koro" epidemics, convinced that they are the victims of a contagious disease that causes their penises to shrink. Episodes are triggered by rumors and last from a few days to several months and often affect thousands. "Victims" suffer intense anxiety, sweating, palpitations, insomnia, and often take the extreme measure of placing clamps or string onto the organ or having family members hold the penis in relays until treatment is obtained, usually from native healers. Occasionally women are affected, believing that their breasts and vagina are being pulled into their bodies. During a koro episode on the tiny island nation of Singapore in 1967, thousands of citizens were affected, both males and females, forcing the government to declare an emergency (Gwee 1968; Mun 1968). Pandemonium reigned during an outbreak in northeast India in 1982. So widespread was the panic that medical authorities took the drastic measure of touring the region with loudspeakers to reassure anxious residents and measured penises at intervals to demonstrate that no shrinkage was taking place (Chakraborty et al. 1983). Ignorance of human perceptual fallibility, combined with rumors and traditional beliefs, resulted in frantic citizens intensely scrutinizing their genitalia.

While koro may seem to represent extreme irrationality to outsiders, outbreaks differ from mass delusions in Western countries in only one significant respect—the rumor-related object. In this case, it is the sex organs and their changing size, shape, and firmness. For the mass delusion to occur, the object of scrutiny must be of perceived importance, and the rumor credible. Hence, in theory, the sole factor preventing similar Western epidemics is the absence of koro cultural traditions.

The Lure of Mass Delusions

Collective delusions possess a powerful seductive lure that continuously changes in a chameleon-like fashion to enable us to confirm our deepest fears or realize our greatest desires. Most Westerners can easily distinguish koro and headhunting scares as the products of myth and superstition. Yet, many of these same people are likely to believe in the reality of flying saucers, ghosts, or psychic phenomena. We must always be prepared to evaluate incredible claims based on the available facts and avoid making emotional judgments. The underlying themes of collective delusions remain constant. Circumstances surrounding the Adelaide earthquake panic of 1976 are virtually identical to those of the London earthquake panic of 1761. Contemporary child-molestation and satanic-cult fears resemble the persecution of various deviants and ethnic groups during the infamous medieval European witch-hunts. Today's wish-fulfillments parallel transcendent elements that have been prominent fixtures in religious movements for millennia. Only the form changes to reflect the social and cultural context.

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Scientific Reasoning and Achievement in a High School English Course

The hypothetical-deductive pattern of reasoning, an advanced reasoning model common to science, can be effectively transferred to the study of English and improve both English usage and reasoning skills.

E. A. KRAL

Though educators in the United States say that they already are teaching thinking and that the physical sciences and mathematics offer opportunities for learning higher-order reasoning skills, most observers agree that the goal of teaching students how to think has not been fulfilled.

The reasons are varied. Perhaps the most serious deficiency is that teachers have never had a clear notion of just what advanced reasoning is—and just what to do to stimulate its development in students.

My own search for effective ways to promote critical thinking during thirty years as a high school English teacher grew out of dissatisfaction with what was offered by various

authors representing the humanities and behavioral and social sciences. Guided by my study of the paranormal and my association with college professors experimenting with various theories of intellectual development, including those of Swiss psychologist Jean Piaget (known for his research of thought processes in children), I turned to the physical sciences for answers.

Emphasizing the *hypothetical-deductive* pattern of reasoning in teaching critical thinking appeared feasible. So by means of a Piagetian-based, systematic instructional theory developed by Anton E. Lawson of Arizona State University, I used this reasoning model in my twelfth-grade English course at Grand Island Senior High in Grand Island, Nebraska, from 1982 to 1991.

This reasoning model, common to science, can be effectively transferred to the field of English (and likely to other curriculum areas, as well as to everyday life); an academic discipline such as English can be used to help students develop higher-order thinking skills of a hypothetical-deductive nature.

Patterns of Advanced Reasoning

Some psychologists have characterized human intellectual development in terms of four major levels or "stages" of thought processes. Piaget called the stages *sensorimotor, preoperational, concrete operational,* and *formal operational.* For this article, the last of these, called by Lawson the *hypothetical-deductive stage,* is of interest. The thinking patterns at this stage are advanced reasoning patterns used in testing alternative hypotheses and are characterized in five ways. Examples in this article are taken from the discipline of English and include language, literature, and composition.

Combinatorial thinking enables the individual to systematically consider all possible relations of experimental or theoretical conditions, even though some may not be realized in nature. For example, one could generate all possible combinations of the several probable causes of Hamlet's depression in Shakespeare's *Hamlet.* One could systematically list the options a novelist has for the outcome of a story given the meaning of the novel, the traits of the characters, and the author's intent. Once generated, these possibilities can then be tested.

In the *identification and control of variables,* the individual recognizes the need to consider all the known variables and to design a test that controls all variables except the one being investigated. One could determine in John Knowles's novel *A Separate Peace* that the differences in the responses to hardship of prep school students Leper and Gene were due to their differences in assertiveness and abilities to communicate. The boys were alike in all other identifiable variables: both were the same age and were sensitive, intellectual, serious students; and both participated in the same activities. Leper dropped out of school to join the military but was discharged during basic training for mental illness. Gene finished school despite a trauma with his roommate, Finny.

Proportional thinking enables the individual to recognize and interpret relationships between relationships in situations described by observable or theoretical variables. While qualitative functional relationships are found in some literary works, seldom if ever are these relationships quantified. For example, one would recognize in Shelley's poem "Ozymandias" (the character Ozymandias calls himself a "king of kings") that a functional relationship exists between the esteem of the dictator's followers and the vast size and quality of the stone statue sculpted as a tribute to him.

Probabilistic thinking enables the individual to recognize that natural phenomena themselves are probabilistic in character and that any conclusions or explanations must involve probabilistic considerations. For example, one may predict that if eight out of ten of fictional character Michael Henchard's interactions with other people in Thomas Hardy's *Mayor of Casterbridge* resulted in a negative impact on the character's life, then his next personal interaction will most likely (a probability of 8 out of 10) have a negative impact as well.

In *correlational thinking,* the individual is able to recognize causes or relations in phenomena under study by comparing the number of confirming and disconfirming cases of hypothesized relations with the total number of cases. In *A Separate Peace,* a chapter analysis of the emotional and physical strengths of roommates Finny and Gene reveals that an inverse correlation exists. At the onset of the novel, Finny is strong and Gene weak, while near the conclusion the opposite is true.

In general, an individual at the hypothetical-deductive stage will have the capabilities to: initiate reasoning with concepts, relationships, abstract properties, axioms, and theories; use symbols to express ideas; apply class inclusion, conservation, serial ordering, and all five characterizations of the hypothetical-deductive stage; plan a lengthy procedure to attain given goals; and be aware and critical of his or her own reasoning process and actively check the validity of his or her conclusions by appeal to other information.

Since we attempt to survive in this world by discovering cause-and-effect relationships, we can examine the existence of such relationships by using the hypothetical-deductive thinking pattern. As shown in Figure 1, this pattern involves the formation of a causal question and subsequent hypotheses, experiments, predictions, results, and conclusions that follow the *if ... and ... then* pattern of thinking.

Outside the physical sciences, where controlled experiments are set and conducted in a laboratory and where replication is likely, all phases of the hypothetical-deductive pattern, including setting up a "test" or gathering instances with

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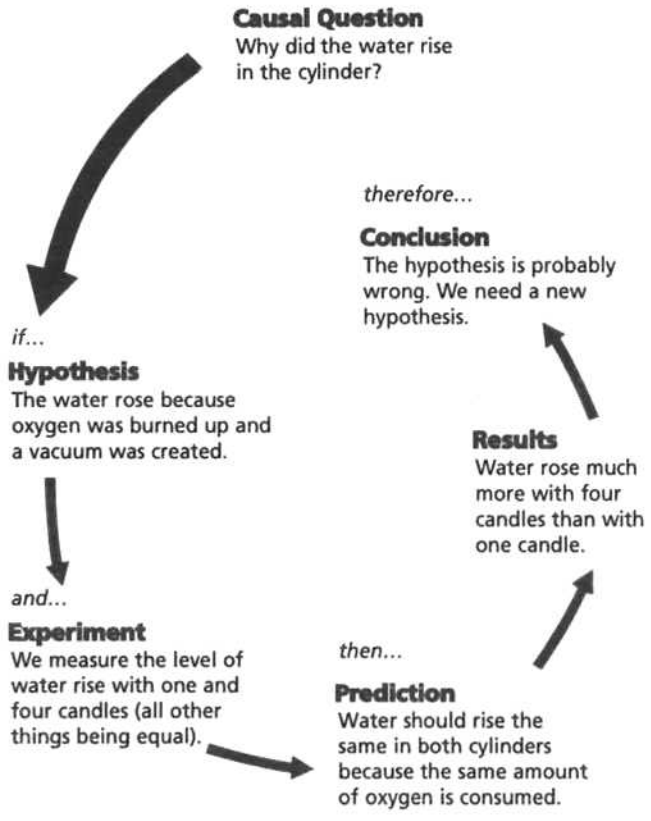
Causal Question
Why did the water rise in the cylinder?
therefore...
Conclusion
The hypothesis is probably wrong. We need a new hypothesis.
if...
Hypothesis
The water rose because oxygen was burned up and a vacuum was created.
Results
Water rose much more with four candles than with one candle.
and...
Experiment
We measure the level of water rise with one and four candles (all other things being equal).
then...
Prediction
Water should rise the same in both cylinders because the same amount of oxygen is consumed.

Figure 1. The Hypothetical-Deductive Thinking Pattern. This *if ... and ... then* pattern of thinking requires students to isolate and control independent variables when comparing water rise with one and four candles in a familiar candle-burning experiment. As shown, the initial hypothesis leads to a contradicted prediction and thus should be rejected. Students must now create an alternative hypothesis or hypotheses and start over again until they have a hypothesis that is consistent with the data. (Adapted from *Science Teaching and the Development of Thinking* by A. E. Lawson, ©1995 by Wadsworth, p. 145, permission granted.)

and without the hypothesized cause, are often intuitively used. But with instruction and experience, the phases can be systematically applied to the discipline of English. In Knowles's novel, for example, students can "observe" the interactions of Gene and Finny and explore human relationship issues such as the struggle for self-identity and the development of maturity. The students often note that despite Gene's traumatic involvement in his roommate's death, he successfully matures by the end of prep school and emerges with several positive traits, including independence.

During class discussion, a causal question arises: Why did Gene become more independent? A hypothesis is formulated: Ending his relationship with Finny caused Gene to become more independent. One possible "test" can be designed: Record Gene's behavior before and after the "breakup" with Finny. The prediction is that Gene should show more evidence of independent behavior during and after the breakup than before. The results are: of the twelve observable instances of Gene's behavior before the breakup, nine show dependent behavior; and of the five instances after the breakup, all five show independent behavior. When the interaction and behavior variables are charted in a matrix, we find that fourteen instances fit the predicted pattern; only three do not. The conclusion is that a correlation exists between the two variables. Although a cause-and-effect relationship cannot be shown, a correlation does suggest the hypothesis is supported.

Theory of Reasoning Development

But how does one stimulate the development of hypothetical-deductive thinking? For an in-depth treatment, see Anton E. Lawson's *Science Teaching and the Development of Thinking* (1995). Briefly stated, it can be done through *self-regulation*, a process in which a person actively searches for relationships and patterns to resolve contradictions and bring coherence to a new set of experiences. Implicit in this notion is the image of a relatively autonomous person, one who is neither under the constant guidance of a teacher nor strictly bound to a rigid set of precedents.

Self-regulation begins with *assimilation*, a phase in which an individual's reasoning assimilates a problem situation and gives it a meaning by present reasoning. This meaning may or may not be appropriate. Inappropriateness produces "disequilibrium," a state that, according to Piaget, is the prime mover of initiating a second phase—*accommodation*. This second phase involves an analysis of the situation to locate the source of difficulty and to form new hypotheses and plans of attack. The results of these reflective and experimenting activities are new reasoning patterns that may include new understandings. In short, self-correcting activities (accommodation) are constantly being tested (assimilation) until this alternation of phases produces successful behavior, or *equilibration* as Piaget called it. For example, in Knowles's novel, Gene is on a high tree limb and his roommate Finny is at the other end, preparing to jump into the river. Finny loses his balance, falls to the ground instead, and breaks his leg, which ruins his athletic career. Some students at first declare it an accident. Later, they see the connection between Gene's prior anger and jealousy toward Finny and his jouncing the limb. Students move from wanting to believe that it was an accident toward realizing the relationship between facts and consequences and responsibility.

Experience with the physical world plays an essential role in self-regulation. Argumentation with others over beliefs and the reasons for these beliefs is also a crucial element in self-regulation.

The Learning Cycle and Methods of Instruction

Systematic instruction based on the above theories includes various teaching behaviors and procedures, inquiry-oriented methods, and the learning cycle, all thoroughly described in Lawson's 1995 text. An important model of instruction is the *learning cycle*. Comprising the phases of *exploration*, *term introduction*, and *concept application*, it is designed to encourage students' self-regulation and intellectual development.

Learning cycles in the discipline of English center around the forms of argument and use of the hypothetical-deductive thinking pattern. The *exploration phase* involves students in initial experiences with readings in which they look for exam-

ples of argument used by characters and the author in literary works. Activities are designed in which students raise questions, generate and test hypotheses, attempt to argue in favor of their own hypotheses and against hypotheses of others in the class, and discover weaknesses in arguments. In the *term-introduction phase*, the teacher introduces a new concept or reasoning pattern, such as arguments using method of differences or concomitant variation, or more typical subject-matter concepts such as tone, style, and character. The teacher introduces a new way of thinking about the experiences of the exploration phase.

The *concept-application phase* involves further student experiences of the same concept or reasoning pattern via others' written examples, presenting science activities as extra experiences in forms of argument, and writing their own examples of forms of argument. During this phase, students are able to self-regulate and come to new understandings.

As an example, one learning cycle developed by Lawson involves reasoning used in argumentation by the method of differences and agreement. It incorporates the novel by Knowles, a board game, and a science experiment. In the exploration phase, students play a board game called "Mastermind" in which the discovery of the colors of some hidden pegs requires use of the method of differences and agreement. The method of differences and agreement is basically a control-of-variables strategy in which, in this case, only one peg color or position is varied at a time. In the term-introduction phase, the teacher introduces the testing of hypotheses via controlled experimentation, independent and dependent variables, and relevant forms of argument. In the concept-application phase, students engage in readings and laboratory activities, including a science experiment that requires use of the separation and control of variables just introduced, a discussion of the inability of fictional prep school student Leper to cope, and a one-page position paper in which arguments by differences and/or agreement are used to defend some hypothesized cause-and-effect relationship in the novel, the game, or the science experiment.

A valuable teaching procedure in the exploration phase and often in the concept-application phase is the division of students into groups of three to five to facilitate peer teaching and cooperative learning. (The teacher dominates the term-introduction phase during large group discussion and circulates from group to group during the other phases to dispense questions and assistance.) At the start of the school year, students are tested to determine their level of reasoning ability; based on the results, groups are formed so that each group contains a mix of those who are and who are not hypothetical-deductive thinkers. (For examples of reasoning tests, see Lawson 1995.) These test results are followed over the semester with daily observations and informal discussions to obtain a more accurate measure of reasoning competence. Grouping of students on this basis insures that each group has its own "teacher," the hypothetical-deductive thinker who increases teacher-to-student communication, intragroup discussion, and learning by all group members.

Course Content and One-Year Curriculum

An academic discipline such as English offers experiences that can help students develop higher-order thinking skills or patterns. It seems the triad of language, literature, and composition offers a fertile field for the application of the hypothetical-deductive thinking pattern. In language and composition, myriads of editing problems face any student. A common editing problem, for example, is determining the completeness or incompleteness of a sentence. A student must know that an independent clause is a group of words that contains both a subject and a verb and can stand alone and make sense, while a subordinate clause has a subject and verb but cannot stand alone and make sense. If a sentence happens to be simple, compound, complex, or compound-complex, then the abilities to identify and control variables, possess knowledge of main and subordinate clauses and their various components, and test hypotheses enable the student to answer the question, "Is my sentence complete or is it a fragment?"

Students need considerable practice in clearly stating the questions, hypotheses, experiments, predictions, evidence, and conclusions drawn. To help them think through all the steps in the hypothetical-deductive thinking pattern, the teacher provides questions to elicit questions, hypothesis generation, and hypothesis testing. The classroom environment must encourage discussion and debate about the appropriateness or correctness of language choices, the meaning of literature being read, and the presentation of arguments in composition projects.

The presentation of two major subject-matter variables can be analyzed and sequenced to encourage hypothetical-deductive thinking along the concrete-to-abstract continuum. The first is the type of discourse students read, analyze, and create. The second is the form of argumentation they read, discuss, and generate in support of major assertions in readings, classroom discussions, speeches, and essays.

The curriculum of my two-semester twelfth-grade English course contained literature and composition activities normally expected in a traditional course. These activities were restructured in the form of eighteen learning cycles that included selected modules and hands-on tasks from Lawson's *Biology: A Critical Thinking Approach.* Emphasis was on the introduction of nine forms of argumentation (see Ziegelmueller and Dause 1975), application of the hypothetical-deductive thinking pattern, and the writing of twelve to fourteen persuasive papers, ranging from a one-page letter and a two-page speech to a ten-page research or position paper, the majority of which were based on literary works by British authors. For a more complete course description, see Lawson and Kral's "Developing Formal Reasoning Through the Study of English" in the Winter 1985 issue of *Educational Forum.*

Results of Evaluation

What were the results of embedding hypothetical-deductive thinking patterns in an English course for nine years? Test data suggest that student achievement improved. A former twelfth-

grade student, Tracy L. Wit, with the help of a statistician at the University of Nebraska-Lincoln, conducted a three-year study (1984 to 1987) of control and experimental groups using a pretest and post-test design that included results of the American College Test (ACT) Assessments, taken on nationally scheduled test dates, and a specially designed questionnaire.[1] I then continued this study through 1991.

Selection of the ACT for evaluation purposes blended well with the course content—reasoning and subject-matter knowledge. Students generally took the ACT on nationally scheduled test dates, assuring test security and integrity as well as a measurement educators cared about. The students considered the college admissions test seriously because they perceived it as a step toward reaching an important goal. Raising their scores also offered immediate rewards for their classwork. Moreover, the English portion of the ACT tested a student's ability to reason out answers in multiple-choice form, and it measured knowledge in the areas of punctuation, grammar and usage, sentence structure, rhetorical strategy, organization, and style that called for the application of reasoning as well as memory, the same kinds of skills needed during the editing stage of their composition projects. An unexpected bonus in 1989 was the addition of the science reasoning test to the ACT.

Significant correlations existed between the English ACT gain/loss score and the math, natural science, and composite ACT gain/loss scores. Questionnaires completed by the 206 participants revealed that a factor important to higher scores was application of hypothetical-deductive reasoning. The use of practice English ACT exams in class, or coaching for the test, was another factor in higher scores, though familiarization with the test was a small part of the thirty days of language instruction during the first semester. Our interpretation was that coaching for the test resulted in only a one-point gain, which corroborated an independent finding in a 1987–1988 study conducted by a Rock Island, Illinois, high school. Three other factors inferred as important were related to the variables of test anxiety and motivation: a positive attitude, confidence, and a degree of concern.

Results of the ACT over a seven-year period (1984 to 1991) reveal that, for the English portion of the test, 171 students in the experimental group had an average pretest score of 20.61 and a mean gain of 3.31; while 295 students in the control group had an average pretest score of 19.82 and a mean gain of 1.93. (The number of students in both groups was much greater but not all were willing to take the ACT on the nationally scheduled test dates in the summer and again the following fall or winter. The average number of students per class in both groups was about 25, the norm for almost any class at Grand Island Senior High.)

For the 1990–1991 school year, the first year for which both pretest and post-test scores for the science reasoning portion of the ACT were available, the 15 students in the experimental group had an average pretest score of 20.62 in science reasoning, and a mean gain of 2.00; while the 60 students in the control group had an average pretest score of 22.25, and a mean gain of 0.36. For more comparative test data, refer to Tables I to IV.

Table I

Difference in mean gain on English ACT for seven-year study at Grand Island [NE] Senior High School.

School Year	Group	Number	Pretest Mean	Post-test Mean	Mean Gain
1984-91	**Males**				
	Experimental	62	20.71	24.10	3.39
	Control	124	19.05	21.03	1.98
	Females				
	Experimental	109	20.51	23.74	3.23
	Control	171	20.59	22.48	1.93
	Totals				
	Experimental	171	20.61	23.92	3.31
	Control	295	19.82	21.75	1.93

Note: Scores reported in this study were recorded only for those twelfth-grade college prep students who voluntarily took the ACT exam on nationally scheduled test dates twice—once in June (pretest) and again in either October or December (post-test).

Table II

Comparative average scores on English ACT test for each of the seven years in the study.

School Year	Grand Island [NE] English ACT Avg.	Nebraska English ACT Avg.	National English ACT Avg.
1984-85	18.7	18.8	18.1
1985-86	19.9	19.1	18.5
1986-87	20.3	19.1	18.4
1987-88	20.2	19.3	18.5
1988-89	20.6	19.0	18.4
1989-90*	22.5	21.0	20.5
1990-91	21.3	20.7	20.3

Note: The ACT was revised in 1989. The state and national test scores were provided courtesy of American College Testing, Iowa City, Iowa.

Discussion

The results were significant. Although various intervening factors could have affected the equivalency of the experimental and control groups, thereby skewing the results, the evidence suggests they can be ruled out.

Members of both groups were randomly assigned by school counselors to the eight to ten sections of the same course annually taught by four different teachers without regard to any student variables other than scheduling availability. Nearly all had previously taken a similar number of "core" courses, and the vast majority scholastically ranked in the top half of their graduating class.

Analysis of membership for the seven years reveals no gender or high-achiever bias between the groups. In the experimental group, 36 percent of the students were male, 64 percent female; in the control group 42 percent were male, 58 percent female. In the experimental group, 38 percent of the males and 48 percent of the females ranked in the top 15 per-

Table III

Difference in mean gain on Science Reasoning ACT for the one year in the study that both pretest and post-test scores were available.

School Year	Group	Number	Pretest Mean	Post-test Mean	Mean Gain
1990-91	**Males**				
	Experimental	7	22.00	24.00	2.00
	Control	35	22.11	22.54	0.43
	Females				
	Experimental	8	19.25	21.25	2.00
	Control	25	22.40	22.68	0.28
	Totals				
	Experimental	15	20.62	22.62	2.00
	Control	60	22.25	22.61	0.36

Note: The science reasoning portion of the ACT was first instituted in the 1989-90 school year. Thus the June 1989 ACT did not yet have a science reasoning portion, making 1990-91 the first year in which both science reasoning pretest and post-test scores were available.

Table IV

Comparative average scores on Science Reasoning ACT test for one year in the study.

School Year	Grand Island [NE] Sci. Reason ACT Avg.	Nebraska Sci. Reason ACT Avg.	National Sci. Reason ACT Avg.
1990-91	21.4	21.3	20.7

cent of their graduating class; in the control group, similar ranking was achieved by 30 percent of the males and 40 percent of the females.

Although a Hawthorne effect may have operated in the experimental classes during the first year or two of the change to new methods and materials, such an effect surely could not account for the differences between the experimental and control group classes sustained over several years.

One cannot rule out the possibility that the greater gains may be related to the particular teacher involved rather than the instructional methods and emphasis on reasoning, since I was the only teacher assigned to the experimental classes. However, prior to my adoption of the new methods and materials, my students displayed no such reasoning improvements. Moreover, such methods have been applied in a wide variety of science classes in which the instructor variable was controlled and have shown comparable reasoning gains. (See Lawson 1995.)

Anecdotal evidence also shows that students in the experimental group benefited from the emphasis on hypothetical-deductive reasoning and the inclusion of several science activities in the class. Their position papers revealed much use of: testing of hypotheses; application of more advanced forms of argument, such as argument by example (probability) and correlation; and far more adeptness in critical analysis of assertions by authors, the instructor, and other students. Student behavior in small group activities revealed, after the initial learning cycles, that they not only enjoyed the shift to active learning but realized more quickly than traditional students that they, not authority figures in their lives, were ultimately responsible for their education.

The experimental classroom looked less orderly than those involving traditional methods, but the course was structured and student-centered. Teaching style was modified to involve less lecturing but continued intervention with questions, suggestions, and directions during both small group and large group discussions. Demands that students care about improving their editing skills for use during the latter stages of their writing projects remained.

Conclusion

This lengthy experimental research in English shows that the hypothetical-deductive reasoning pattern via the Piagetian-based instructional theory designed by Lawson can be embedded into and successfully transferred across various curricula with a measurable improvement both in reasoning and subject-matter achievement. The research also defines critical thinking with more clarity and preciseness, and shows us how it can be encouraged in actual practice. The above findings are timely, for as the Rockefeller Foundation urged in its 1980 study *The Humanities in American Life*, critical thinking should be viewed as a basic skill on all educational levels.

Note

1. The ACT is offered nationally in June, October, December, February, and April. In this study, "pretest" refers to the ACT offered in June, prior to the school year. "Post-test" refers to either the ACT offered in October or the one offered in December, whichever a particular student opted to take. Minimum score is 1; maximum is 36.

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Skepticism and Politics

For skeptics who want to be politically active, some options are more attractive than others.

BARRY FAGIN

What is the connection between skepticism and politics? What are the appropriate politics for a skeptic? Does being skeptical automatically dictate one's political outlook, or are there alternative points of view consistent with skepticism?

I ask these questions because I think skeptics have not devoted enough attention to them. This is hardly surprising, considering our nature. As skeptics, we are accustomed to deliberation, evaluation of evidence, and the insistence upon extraordinary evidence in support of extraordinary claims. These traits are not important to the political process, which instead rewards appeals to emotion and the successful manipulation of human passion. It is no wonder we are uncomfortable in the political world. It represents everything we reject in our search for understanding.

And yet, we are faced with inescapable evidence of the importance of politics. Like it or not, many aspects of our lives are affected and will continue to be affected by the

political process. Simple self-interest, therefore, suggests that skeptics should address political issues. Perhaps more important, skeptics have a great deal to offer their fellow citizens. The visibility afforded to the political process could provide a useful platform for rational inquiry so conspicuously missing from modern debate.

This article explores some of the connections between skepticism and politics. I begin with a discussion of the testability of political claims. I then discuss a well-known view of the distinction between politics and morality and its relevance to the skeptic. I next examine the defining institutions of politics, developments in the social sciences that could affect the politics of a skeptic, and issues that skeptics find especially troublesome. I will conclude with some of the political options for skeptics, along with a choice that is, in my judgment, unacceptable.

The Importance of Testability

To a skeptic, the testability of a claim is its most important feature. Unfortunately, the testability of political hypotheses is extremely low due to the difficulty of controlled experimentation. One wonders if the term *political science* in fact has any meaning at all.

Suppose, for example, we wish to evaluate the effectiveness of income redistribution in reducing poverty. We cannot create two identical societies, giving one a placebo income tax and the other a real one, administered in double-blind fashion. The political process affects all members of a given community; there are no disinterested observers to evaluate the outcome.

We must instead live with the imperfect alternatives of cities, counties, states, and nations as poorly conducted experiments in social organization. Although these experiments lack controls and counterfactuals, and take long periods of time before they produce measurable results, they are the skeptic's best source of factual information on political issues.

Thus a skeptic should be familiar with history, politics, and economics, despite their lack of strong predictive value as social sciences. A skeptic should know how human beings have tried to organize themselves socially. When a skeptic makes a claim about the feasibility of some political outcome, she should be able to present similar examples from history. Similarly, when a skeptic challenges a political claim, he should require examples in support of the position. The more extraordinary the claim, the more credible the examples must be.

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Skepticism and Morality

Many political claims, of course, are not falsifiable at all. These include statements like:

- "We have a duty to help those members of society unable to help themselves."
- "Homosexuality is not the moral equal of heterosexuality."
- "Health care is a right, not a privilege."
- "Government must inculcate virtue in its citizens."

These are not empirical claims, but moral ones. They are statements indicating deeply felt values of the speaker. They serve as axioms of a belief system.[1] The adherence to moral values is not incompatible with skepticism, although a skeptic's moral axioms may be more amenable to change over time than most, given his or her mental habits of constant questioning and reevaluation. What can we say, though, about the relationship between a skeptic's moral values and his or her politics?

Skepticism and Government

The key insight, I believe, is that while politics and morality are related, they are not identical. All political actions should be moral, but the converse does not hold. There is a large regime of action that includes morality but that, in a just society, excludes politics. This view is essentially that of classical liberalism, which views human beings as agents with rights that governments are established to secure, not as means to be used to a given end. Such a view recognizes the right of the individual to make moral decisions without state interference, so long as the rights of others are respected.

Politics is socially sanctioned force: political solutions to problems are all about forcing people into a course of action. This provides a way to distinguish moral statements from political ones. If the statements above are made in a political context, they are more appropriately interpreted as:

- "People must be forced to help those who cannot help themselves."
- "Government policies should distinguish between heterosexuality and homosexuality."
- "Government must provide health care, even if it means compelling people to do so."
- "People should be made to be virtuous."

A perspective that recognizes this distinction between politics and morality may permit skeptics to engage people with different moral values on political questions, despite seemingly insurmountable differences of opinion.

Skeptics themselves, in fact, may hold widely differing moral values. If they are to successfully reconcile their politics and their skepticism, however, then *they should apply the same techniques of critical inquiry toward the institutions of politics that they apply to all other institutions.* The institution of government and the use of coercion as a social tool, the two cen-

tral characteristics of politics, should be examined critically. In my judgment, economic theory, the evidence of history, and simple daily experience suggest that government is a very poor tool for solving social problems. If this view is correct, then it has profound implications for the politics of skepticism.

Skepticism and Public Choice Theory

Readers who have long maintained a belief in the effectiveness of politics as a means to achieving social ends should be aware of recent developments in the social sciences. The theory of *public choice,* in particular, warrants careful study. Public choice theory, developed by the economist James Buchanan, generates testable predictions about the behavior of political institutions. These predictions are supported through empirical observation, suggesting that every skeptic should have at least a working knowledge of them. For his work in the development of public choice theory, James Buchanan received the 1986 Nobel Prize in Economics.

Briefly, public choice theory applies to the public sector economic principles that were, in prior scholarship, applied only to the private sector. Earlier methods of economic analysis assumed that while human self-interest was dominant in private affairs, it played no role in public affairs. When private actions led to "market failure," public institutions were assumed to be able to correct it due to superior knowledge, motivation, or other attributes. In brief, governments were assumed to be "above" self-interest and thus more effective in solving social problems.

Public choice theory suggests that this assumption is not correct. Self-interest is dominant in all human affairs, both public and private. This means that, when addressing a political solution to a possible incidence of market failure, the possibility of *political failure* must also be considered. Political failure is simply what occurs when the political solution does not work, has negative unintended consequences, and/or creates a worse situation than the problem it was intended to solve. Research in public choice theory suggests that, when compared with market failure, political failure is both much more likely and much more difficult to correct.

Readers who are interested in learning more about public choice theory are referred to Buchanan's original work (Buchanan and Tullock 1964) and a summary of the supporting evidence twenty years later (Buchanan and Tollison 1984). Copies of these books belong on every skeptic's bookshelf.

Difficult Issues for Skeptics

If skepticism about government is warranted, then the skeptic is placed in a difficult position on issues where science and public policy overlap. On the one hand, our commitment to the highest principles of objective inquiry and our understanding of the manifest contributions of science suggest we should support governmental activity in science education, increased federal funding for scientific research, the banning of medicines not proven safe and effective, and so forth. On the other hand, skepticism about government tells us that these policies *as implemented in practice* are likely to have unintended consequences, precisely because government is involved (Martino 1992; Fagin 1993).

One cannot help being outraged, for example, at the modern tragedy of faith healing so eloquently described by James Randi in his book *The Faith Healers* (Randi 1987). The venality, corruption, and baseness of its practitioners seem to be exceeded only by the gullibility of its followers. And yet, those who are skeptical should ask how effective political approaches might be. Should faith healers be taxed, since they're not a "legitimate" religion? If so, who would decide religious legitimacy? Should faith healers be prosecuted for fraud, even if their victims continue to believe? If so, how would such prosecutions be undertaken? How would a Department for the Investigation of Faith Healing actually behave in practice? How effective has coercive action been historically in coming between desperate, deluded people and something they want to believe in? The answers to these questions, it seems to me, put skeptics in the position of reluctant laissez faire. Although we may abhor faith healing and want to see faith healers out of business, we should recognize that the institutions of politics are ill-suited to deal with this issue.

A similar, but more controversial, example of the dilemma skeptics face in the public arena appeared in the July/August 1995 issue of the SKEPTICAL INQUIRER (Barrett 1995) and in succeeding letters to the editor (Lantz et al. 1995) concerning the role of the FDA in the regulation of medical practice. On the one hand, skeptics understand that science is the best way to find out how the world works. People who choose to avail themselves of medical techniques that have not been substantiated scientifically are, at best, wasting their money and, at worst, endangering their lives. And yet, skeptics should ask if a ban on unproved medications and unconventional medical practices truly represents an improvement. Public choice theory suggests, and the evidence shows, that agencies like the FDA act to increase their budgets and regulatory authority far beyond that which was originally intended. They tend to err on the side of caution, trading lives saved by banning unproved products for lives lost due to delays in new device and drug approval. The right way to make such a tradeoff is far from obvious (Higgs 1994a and 1994b). There are also serious difficulties in treating "safety" as an objective concept. To a bureaucrat, safety can be shown only by a multiyear drug study using careful controls and rigorous scientific standards. To a young man dying of AIDS, the safety of a drug means something quite different.

The way out of these dilemmas, it seems to me, is provided by the distinction between politics and morality. Even though we as skeptics understand that science is the best way of discovering truth about the physical world, others do not understand this, or at least find discovering truth about the physical world peripheral to other concerns. So long as their actions do not harm others, we must regrettably permit others to act on these beliefs, simply because *coercion is unlikely*

to improve the situation. We can hope to persuade voluntarily, through personal example and through vigorous articulation of why science and critical thinking are important, but skepticism about the defining institutions of politics demands that we not use force against people who believe in faith healing, laetrile, and channeling.

The Politics of a Skeptic

What does this mean for skeptics who wish to affiliate politically? What kind of political activism is most appropriate for skeptics? These issues are especially difficult today, since the application of a critical perspective to the institution of government distinguishes the politics of a skeptic from both liberalism and conservatism.

Liberals hold an almost religious belief in the effectiveness of government as a social tool. They tend to regard human society as inherently beset with problems, problems that government is called on to fix. When challenged on the evidence of the effectiveness of government, many retreat to a moral belief in the legitimacy of government as an institution for achieving "social justice." If evidence suggests that present policies are ineffective, then the answer is believed to be "reform," better accountability from government officials, or similar panaceas. The response to the confirmation of the predictions of public choice theory is an appeal for less self-interest, a call for more legislation, or (perhaps not surprisingly) demands for still greater political involvement. A willingness to question the effectiveness of government as a solver of social problems is not characteristic of modern liberalism. It is, therefore, difficult to reconcile with the politics of skepticism.

But neither is conservatism a friend of critical inquiry. Conservatives maintain an unwillingness to examine assumptions about the effectiveness of government as an inculcator of virtue and a cultivator of values. Their support of drug prohibition and the regulation of pornography on the Internet,[2] for example, despite the massive failures of the former and the sheer impossibility of the latter, can in my judgment only be explained by an ignorance of the predictions of public choice theory and a belief that the effectiveness of such policies is at best peripheral to their desirability. Such a perspective also seems difficult to reconcile with skepticism.

Conclusions

It seems to me that skeptics who wish to be politically active have a limited number of choices. They can affiliate with the growing libertarian movement and the Libertarian Party, which has a historically informed view as to the limited sphere of action within which government can effectively operate and accepts public choice theory as the one most compatible with existing evidence. This is what I have done. Another possibility is to work with the Republican Party, suggesting that the same factors that limit the effectiveness of government in managing the economy limit its effectiveness in personal affairs as well. This is the approach adopted by the Republican Liberty Caucus. Still a third possibility is to work with the Democratic Party, using reason and historical evidence to show that government is not an effective tool for improving the lives of the poor in any meaningful sense. Readers interested in this approach should consider joining the Democratic Freedom Caucus. All these organizations can be reached on the World Wide Web at www.lp.org, www.rlc.org, and www.progress.org/dfc, respectively.

But renouncing politics altogether is a luxury that skeptics cannot afford. When confronted with the *de facto* increase in the politicization of American life, even in the face of a Republican-controlled Congress that claims to champion limited government, skeptics cannot afford to sit on the sidelines. If we remain aloof, then by our silence we will have contributed to a world where people believe that they can have things without paying for them, that compelling charity is compassion, and that banning vice is virtue. Now, more than ever, American politics needs reason and clear thinking. If we do not provide it, who will?

Notes

1. I use the term *axiom* casually here, since belief systems in modern politics are seldom consistent.

2. I am referring here to the Communications Decency Act (CDA), signed into law on February 8, 1996, as part of the Telecommunications Reform Act of 1996. On June 12, in a thoughtful and articulate decision, a federal court in Philadelphia found the CDA unconstitutional. (A similar ruling was also handed down on July 29 by a federal court in Manhattan.) The author has a personal interest in this issue as a co-founder of an organization that is challenging the constitutionality of the CDA. The Supreme Court heard the case on March 19, 1997; an opinion is expected before the Court's summer recess. Interested readers are invited to visit the web site of Families Against Internet Censorship, at rainbow.rmi.net/~fagin/faic/.

For an analysis of the civil liberties challenges and enforcement problems of the Communications Decency Act, see Corn-Revere 1995.

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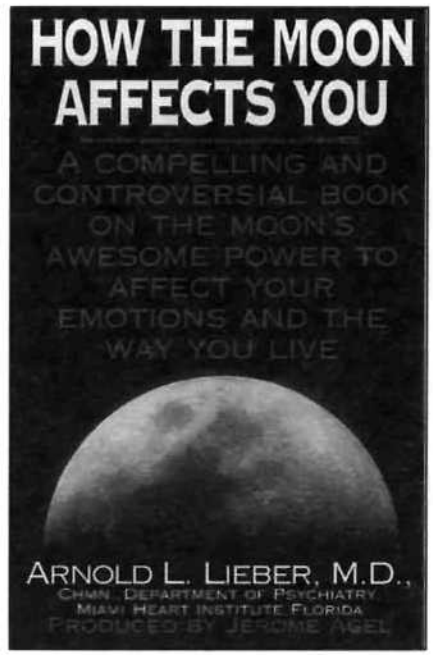
Moonshine

JAMES ROTTON

How the Moon Affects You. By Arnold L. Lieber, M.D. Hastings House, Mamaroneck, NY. 1996. ISBN 0-8038-9378-7. 191 pp. Paperback, $14.95.

The cover of *How the Moon Affects You* advertises it as a "revised and updated version" of *The Lunar Effect*, which was published in 1978 (Anchor Press). There are two differences between this update and its predecessor. First, Lieber has given the book a title more likely to appeal to those who believe in astrology. This is not entirely bad. With its new title, the book is less likely to be mistaken for a scientific work. It will probably end up in the New Age section of bookstores. Second, its author has added a fourteen-page afterword entitled "New Research."

The book's predecessor introduced the world to Lieber's "biological tides theory." This theory maintains that since the moon causes ocean tides and the human body is 80 percent water, the moon's gravitational pull also causes tides in the human body. If one accepts these premises, it's a short step to believing that some people behave irrationally when their water balance is upset. Astronomers reject this argument as being based on a crude and misleading analogy. In a cogent review that appeared in the Spring 1979 SKEPTICAL INQUIRER, astronomer George O. Abell pointed out that the moon's gravitational pull was less than the weight of a mosquito. Two of my colleagues, Roger Culver and Roger Ianna, subsequently showed that the moon's "pull" was less than that of a wall of a building six inches away (see Culver and Ianna 1988).


HOW THE MOON AFFECTS YOU
A COMPELLING AND CONTROVERSIAL BOOK ON THE MOON'S AWESOME POWER TO AFFECT YOUR EMOTIONS AND THE WAY YOU LIVE
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This book contains very little that is new, as Lieber acknowledges: "When invited to revise and update the material in the present book, I was surprised to learn how slight the modifications were. Most of the earlier findings are still relevant" (p. 156).

It would take too much space to identify (let alone correct) all of the errors that precede this conclusion. However, Lieber's claims have turned out to be wrong so often in the past that I felt compelled to do a line-by-line comparison of the two books. Lieber's revisions served to save face. For example, Lieber's first edition describes how he learned that the earth, sun, and moon would line up in January and February of 1974. Because this "cosmic coincidence" would cause high tides, Lieber alerted the Miami police, the local news media, and the emergency room of a public hospital to expect an outbreak of abnormal and criminal behavior. Lieber repeats this story in his revised edition, complete with the line: "Sure enough, all hell broke loose" (p. 61). After two pages of anecdotal evidence, his previous edition concluded by noting that there would be another cosmic coincidence in December 1990 and in January 1992. But of course these dates passed uneventfully. So it is not surprising to find that this is one of Lieber's few revisions.

Another revision can be found in Lieber's reference to *The Jupiter Effect* by John R. Gribbon and Stephen H. Plagemann (Random House, 1974), a book that, according to Lieber, reports "the significance of tides as triggers of earthquakes" (p. 86). He states that Gribbon and Plagemann are concerned that a coincidence of cosmic cycles "may trigger another great California earthquake." But when? He gives no date. But, if we turn to Lieber's earlier edition, we find that he gave a date: 1982. Of course, no earthquake of any note occurred in California that year.

Unfortunately, instead of correcting past errors, Lieber has added fourteen additional pages of faulty logic, distorted facts, and ad hominem arguments in the

chapter entitled "New Research." He reports that there have been "at least 43 data-based studies" since *The Lunar Effect* appeared in 1978. That number sounds about right. However, Lieber errs when he asserts that "critical review of documented findings reveals the following: positive and negative findings are pretty much equally divided" (p. 156). The fact is that most studies have failed to uncover anything resembling support for the lunar hypothesis, as I. W. Kelly, Roger Culver, and I have documented (Kelly, Rotton, and Culver 1996).

Lieber doesn't cite (let alone review) any of the "at least 43 studies" that he mentions, nor does his bibliography contain references to works that appeared since the first edition of his book. Instead of describing what other scientists have found, he devotes seven pages to a failure to replicate his work with C. R. Sherin. In a 1972 article, Lieber and Sherin uncovered what they claimed was "a lunar effect" for homicides in Dade County, where Miami is located. Their data spanned the years between 1956 and 1970. The present book contains a graph (on page 41) that seems to suggest that homicides peaked at the full moon. As Kelly, Culver, and I have documented (Kelly, Rotton, and Culver 1985–86), Lieber and Sherin based their claims on three tests that attained significance. They neglected to tell readers that they performed forty-eight tests of significance in all. Not divulging this information is like a gambler failing to tell us how many times a coin was tossed before three heads came up. Since Lieber and Sherin chose a conventional ($p < .05$) level of significance, we would expect 2.4 (i.e., $.05 \times 48$) of the tests to attain "significance" by chance alone.

Be that as it may, let's take a closer look at Lieber's new evidence. It consists of a plot of homicides in Dade County (2,714 new cases) between 1971 to 1980. Although Lieber does not give a value for his statistical test, he reports that it resulted in a "chi-square with a high significance ($p < .001$)." But there's a problem: Homicides did *not* peak when the moon was full! Rather, as Lieber reports, "the new-moon and full-moon peaks vanished. We found a peak midway between new moon and first quarter" (p. 160). This is obviously embarrassing, and Lieber suggests that "A. D. Pokorny and colleagues, Rotton and colleagues, and G. O. Abell would say 'Aha, failure to replicate: previous results were Type I error. I told you so!'" (p. 161)

I can't speak for Pokorny, Abell, and others, but my guess is that Lieber's result stemmed from his failing to control for weekend and other secular trends. Of particular importance is the fact that the 29.54 days in the moon's synodic cycle is very close to 28–31 days in the months of the year. There are ways to avoid the biases that these trends introduce, as my colleagues and I describe in some of the articles that Lieber cites. However, instead of using these methods, which are pretty standard in econometric analyses, Lieber devotes a long paragraph to recounting all of the problems that have afflicted Miami during the 1970s: the Mariel boatlift, population increases, Cocaine Cowboys, et cetera. None of these would surprise viewers of *Miami Vice*, but one has to wonder why Lieber did not apply the same reasoning to his earlier study when Miami had to contend with Castro's revolution, an influx of refugees, Watergate burglaries, and the five thousand deaths chronicled in Edna Buchanan's Pulitzer Prize–winning *The Corpse Had a Familiar Face.*

After his long digression, Lieber uses a three-day moving average to smooth out the graph for 1971–80 homicides, and he applies the same operation to the data for 1956–70. Now, however, Lieber does not blame a full moon. He instead concludes that the curves reveal "an underlying semi-monthly lunar rhythm" (p. 165). Lieber has stumbled on an old truth that would be obvious to anybody who has taken a first-year course in econometrics: The easiest way to generate a curve is to average adjacent observations. The curve will be even more impressive if one superimposes a dotted sinewave over it, as Lieber does; doing so distracts attention from the data's irregularities and differences between the graphs for homicides during the sixties and seventies. Those who teach statistics might want to use the graphs in this chapter to show students how figures can be made to lie.

Not only does Lieber distort his own work, he also misrepresents what others have written. As an example of sloppy scholarship, he refers to an article by Culver (1988), which was actually written by Culver, Kelly, and myself. He states that Culver committed a Type II error "when he [*sic*] reported on G. O. Gilbert's findings" (p. 165).[1] As Lieber reports, Gilbert found that *fewer* assaults occurred when the moon was full. He takes my coauthor, Culver, to task for concluding that this is contrary to the biological tides theory: "This is a clear example of a Type II error that results when a researcher is either blind to the theoretical underpinnings of his subject or is blinded by unconscious bias" (p. 166). The fact is that it was Gilbert who concluded, in his thesis, that "the number of significant full moon correlations was only slightly greater than expected by chance. . . . Since the sign of the correlation [for assaults] was negative, the relationship was a new moon relationship rather than a full moon relationship" (p. 166). Unlike Lieber, who cites a page from *Dissertation Abstracts* as his source, my colleagues went to the trouble of obtaining a copy of Gilbert's thesis. Ironically, Lieber lists Gilbert as one of two persons who are "finding lunar connections." The other person he lists is a scholar (Michael Persinger) who has done interesting work on geomagnetic activity but who has never published an empirical study on lunar cycles.

By now it should be clear that Lieber interprets any and all departures from chance as a "lunar effect." He began by claiming that he had uncovered a lunar

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effect when three out of forty-eight tests of statistical significance uncovered a greater number of homicides during the full moon in Miami between 1956 and 1970. He extended his theory to account for an apparent increase in homicides that occurred *after* full moon periods in Cleveland (see Sanduleak 1985). Now he interprets peaks during the new moon and first quarter as lunar effects.

Rather than deal with these inconsistencies, Lieber tries to distract attention away from flaws in his theory by attacking those who have raised questions about his theory and the data on which it is based. Referring to reviews written by Kelly, Culver, and myself, he charges:

> While they intellectually can accept that much of the evidence (including their own) supports the existence of a small lunar effect on behavior, they were unable to comprehend that such small effects, under certain circumstances, can have dramatic impacts upon behavior. Their viewpoint suffers from the absence on their team of a researcher trained in neurochemical effects on behavior. . . . One marvels at how adept these authors were at waving a mathematical wand and causing to vanish the results of seventy years of field and laboratory research. (P. 159)

First, we have never accepted that "the evidence supports the existence of a small lunar effect." We would not, and have not, used a term (namely, lunar *effect*) that implies causality when discussing alleged correlations. What we have stated, in more than one article, is that the effect size for lunar associations in this area is so small that it is best chalked up to chance. In Kelly, Rotton, and Culver 1996, we stated that meta-analyses of previously published findings indicated that phases of the moon "accounted for no more than $^{3}/_{100}$ of 1 percent of the variability in activities usually termed *lunacy*" (18). Such a small percentage is too close to zero to be of any theoretical, practical, or statistical interest or significance.

Second, if I were a psychiatrist, I would point out that Lieber evidences a considerable amount of ambivalence toward statistics. On the one hand, he makes much of the fact that his results achieved statistical significance; on the other, he ends one chapter by repeating Carl Jung's tired saw about "the ruinous influence of statistics," and he complains about critics who utilize a "statistical sleight of hand" (p. 158). The fact of the matter is that my colleagues and I used the same statistical procedures that the medical community uses to evaluate empirical findings. I find it disturbing that a physician who lists the Miami Heart Institute as his affiliation shows such a disdain for statistical evidence.

Finally, Lieber's remark about our research team's needing "a researcher trained in neurochemical effects" comes close to being an ad hominem argument. However, rather than take umbrage, I will use this forum to invite Lieber to name a published neurochemist who would be interested in joining us in evaluating research on lunar periodicities. I suspect that Lieber is going to have trouble responding to my invitation, because I failed to uncover anything dealing with lunar periodicities and neurochemical changes when I did a computer search of the literature. My search included all of the works listed in PsychLit, the GENMED option on LEXIS-NEXIS, and the computer library for *Dissertation Abstracts*. I located fifty-three works, including Lieber's original publications. To put this small number into perspective, I might note that LEXIS stopped searching after one thousand articles when I did a search on "circadian rhythms."

Most of the lunar studies I found dealt with psychological variables (e.g., homicide, psychiatric disturbances). A good number were by scholars (e.g., Kelly, Saklofske, Martin, Culver) whom Lieber dismisses as "skeptics." Only a few considered substances that might interest a neurochemist, and none of these studies has been replicated. My search failed to uncover any studies linking lunar cycles to substances that have been implicated as possible correlates of stress and aggression (e.g., serotonin, melatonin, epinephrine, norepinephrine, testosterone, cortisol, vasopressin [directly relevant to fluid content], growth hormone, pH, 17-OHCS, adrenocrotropic hormone).

It is hard to believe that all of the researchers who have documented circadian rhythms in stress hormones didn't collect enough data to check for lunar cycles. It is even harder to imagine that nobody has looked for a biological tide in biochemical processes when one considers the number of times that physicians send blood and urine samples out to be assayed.

However, instead of presenting data that would support his claims, Lieber resorts to repeating what others have told him in undocumented conversations. To take one of many examples, he states that a scholar working at Stanford "told me that this remarkable finding was replicated by other researchers" (p. 168). It doesn't take a lawyer to recognize this as hearsay.

Lieber ends his book with his response to a question posed to him in October 1978. Two things make Lieber's response worth quoting. First, it gives a feel for the kind of nonsense that Lieber offers as evidence in this book. Second, I am astounded that anybody could remember such a long soliloquy. When asked to elaborate on how "[m]an's responsiveness to subtle and persuasive effects provides us with an option for survival of our species," he responded:

> By virtue of our innate responsiveness to these imperceptible influences, we have within us a mechanism for survival under the most adverse of terrestrial circumstances. Suppose that at a time in the future a nuclear conflagration occurs. The only survivors are those lucky enough to have descended into underground shelters or caves located far below the Earth's surface. Solar and societal timing cues soon would be eliminated in such a hostile environment. The only forces that penetrate to Earth's core are gravity and geomagnetism; because our systems are capable of resonating with these two forces, we are able to synchronize our body's rhythms with

them. . . . Our biological clocks would not run down, as neurospora aboard Spacelab I did. Man becomes ill and nonfunctional when his body rhythms are disorganized; having the capacity to use gravity and geomagnetism to synchronize rhythms provides us with a crucial survival option.

Maybe. However, I suspect that having a biological clock out of sync is the last thing most of us would be worrying about after a nuclear conflagration.

Notes

I thank W. H. Laverty and P. Quincey for sharing their thoughts about Lieber's book and I. W. Kelly for commenting on an earlier draft of this review.

1. A Type II error is a statistical concept described in introductory textbooks. Investigators commit a Type II error when they fail to reject a null hypothesis that is, in fact, false. However, it is more common to discuss the probability of a Type II error in terms of its complement (namely, *power*). There are several ways to increase the power of statistical tests (see Rotton and Schönemann 1978). The most common way in research on lunacy is to base one's conclusions on larger samples and data sets that cover a long period of time. As Kelly, Rotton, and Culver (1985–86) report, neither is associated with the probability of significant results in this area.

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Houdini!!! At Last!

MASSIMO POLIDORO

Houdini!!! The Career of Ehrich Weiss. By Kenneth Silverman. HarperCollins, New York. 1996. ISBN 0-06-016978-8. 466 pp. Hardcover, $35.

For years, among magicians and magic scholars, it was rumored that a new biography on the life of Houdini, "the Elusive American," was being prepared by such a qualified man as Kenneth Silverman. Professor of English at New York University, codirector of the NYU Biography Seminar, and author of four earlier books, including *The Life and Times of Cotton Mather*, winner of the Pulitzer and Bancroft Prizes, and winner of the Edgar Allen Poe Award from the Mystery Writers of America, Silverman is also a member of magic organizations and a former performer under the name of "Ken Silvers."

Now the rumor has become reality, and readers will not be disappointed. Many biographies on Houdini have been published during the last seventy years, starting with Harold Kellock's 1928 "official" biography, through to William Lindsay Gresham's *Houdini: The Man Who Walked Through Walls*, Milbourne Christopher's *Houdini: The Untold Story*, James Randi and Bert Randolph Sugar's *Houdini: His Life and Art*, Ruth Brandon's *The Life and Many Deaths of Harry Houdini*, and tens of other lesser monographs on the man and his work. However, what sets this book apart from most of the others is its exclusive attention to facts rather than folklore, hearsay, and undemonstrated suppositions and theories. Furthermore, the completeness of the book has been greatly enhanced by the author's study, in many cases for the first time, of Houdini's personal diaries, scrapbooks, manuscripts, letters, and notes. This leads to the discovery of many previously unknown facts and to the debunking of often repeated errors and myths in the Houdini story.

The whole development of his act and personal image, the escapes and challenges all over the world, are described in detail and often with new revelations; however, a great deal of space is also dedicated to Houdini's other interests: his brief career as an aviator; his passion for collecting not only magic, but also drama memorabilia and books; his rise as a movie star and then failure as a cinema producer; his feuds with competing magicians and escape artists, but also his care and support to magicians fallen in disgrace or their widows. Also described are his attempts at serious literary work and his story writing. H. P. Lovecraft, who in his youth also worked as a ghost-writer for one of Houdini's stories, described Houdini as "supremely egotistical, as one can see at a glance," but later in the magician's life credited him with having "a tremendous amount of penetrative skill and workable erudition" concerning the human capacity for self-delusion.

And, for the first time, the documented revelation that Houdini had an affair with Charmian London, the widow of American writer Jack London, is described. In her unpublished diaries several tantalizing short comments on her love story with Houdini, whom she called "Magic" or "Magic Lover," appear; many others, however, written in a stenographic code devised by her uncle, remain undeciphered.

What appears to be more interesting, however, are the extensive descriptions of Houdini's investigations of mediums and of his confrontations with spiritualists, notably his friendship/enmity with Sir Arthur Conan Doyle.

At least a third of the book (150

pages) is devoted to Houdini's interest in psychical research. Here, he appears as having been, at least in the beginning, amateurish in his approach to scientific research and often more interested in the sensationalization of his cases. An example is the case of George Valentine (or Valiantine), a medium who agreed to be tested by the *Scientific American* committee, of which Houdini was a member, in order to win their challenge to mediums to demonstrate psychic phenomena under controlled conditions. After sitting with him, Houdini disclosed to journalists that the committee had caught him in a fraud and went on to reveal the secret wiring of the séance room that allowed the experimenters to determine when the medium had left his chair to produce the phenomena. In doing so, however, Houdini violated the members' agreement to keep test results secret until a unified report could be written and, more important, revealed the secret control that might have enabled the committee to expose another "half dozen Valentines."

He was no James Randi when it comes to exposing frauds, but he has to be credited with having brought to the general public's attention the important role that an expert of deception (he didn't want to be called a magician) can have in detecting fraud in psychical research.

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And, in fact, this is best shown in the famous investigation of the medium Mina Crandon, alias "Margery." The story has often been told in many biographies and by Houdini himself in a self-produced booklet on the case. However, Silverman's re-creation appears to be the more accurate, and it alone justifies the price of the book. In brief, the *Scientific American* committee had held thirty séances with Margery and was on the verge of awarding her their prize; Houdini, however, had never been informed of the case because the investigators saw no need to "bother" him while he was on tour. He was outraged and immediately went to Boston to sit with Margery. At the very first séance he was able to spot her methods and, after a few more sittings, became anxious to inform the world about it. The other members tried to hold him, while preparing a joint report (which, however, took nearly six months to write), but he couldn't allow the Crandons to tell the newspapers what he considered to be black lies. So, when a preliminary report was published after a couple of months, Houdini felt released from the vow of confidentiality and began a campaign to unmask Margery's secrets. This led to his alienating the friendship of all the other members of the committee, who felt his actions made them look foolish.

Houdini violated the members' agreement to keep test results secret until a unified report could be written and . . . revealed the secret control that might have enabled the committee to expose another "half dozen Valentines."

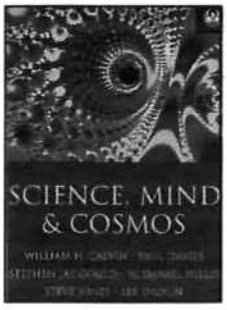
It was only after new facts on Margery came to light that Houdini felt vindicated: others, including a young J. B. Rhine and a group of investigators from Harvard, had found proofs of her deceptions and published their results, confirming Houdini's allegations. Houdini's committee colleagues apologized to him and admitted that he had been right much of the time. Houdini would surely also have been happy to learn, as it happened after his death, that his claims that two committee members, Herward Carrington and J. Malcolm Bird, had helped Margery fake her phenomena in exchange for sexual favors were true.

Interesting is the less-known theory, developed by the Harvard group, to explain the Margery séances. Briefly, Margery's séances were a convoluted marital charade: her actual audience being not Houdini or Conan Doyle or the *Scientific American* committee but her husband, whom she helped in his own self-delusion in order to save their collapsing marriage.

Margery herself didn't despise Houdini, as has often been reported in previous accounts. It is true that her husband and Conan Doyle exchanged racist comments on Houdini's being Jewish; Margery, however, later disclosed that she admired Houdini for not being taken in by her, and for not being afraid "to say where he stands."

Even in the description of Houdini's death we find new information and different points of view. And this is where the book ends, with no further comments on Bess and Ed Saint, the Halloween séances, the Arthur Ford messages, and the growth of the Houdini myth all through the decades. Two personal memories, however, by Houdini's niece Marie Hinson Blood and Houdini expert Sidney Radner are included at the end of the book.

The documentation for this biography was so extensive that it required "a typescript of one hundred and fifty pages" and, as a result, could not be included in the text. However, for the magic community, and readers with scholarly interests in the history of magic, the detailed documentation is being issued separately as *Notes to Houdini!!!* under the imprint of the magic publishers Kaufman and Greenberg (Washington, D.C.) to benefit the Houdini fund of the Society of American Magicians. □



Pocket Guide to Origins and Evolution

MONTY VIERRA

Science, Mind & Cosmos. Edited by John Brockman and Katinka Matson. Phoenix, London. 1996. ISBN 1-85799-585-6. 60 pp. Paper, 60 pence.

This little tome, which returns us to the original meaning of a pocket book, is a collection of six essays from a larger work by the same editors, *How Things Are: A Science Tool-Kit for the Mind* (Weidenfeld and Nicholson, London, 1995). As with the main book, the purpose of this abridged edition is to serve as an "intellectual primer" to the sciences. The six essays cover several of the main topics of contemporary science, ranging from our origins to our evolution.

Paul Davies begins the book, appropriately enough, with his essay that asks, "What Happened Before the Big Bang?" He finds in the explanation of Augustine of Hippo a precursor to the contemporary scientific view: "The world, he claimed, was made 'not in time, but simultaneously with time'" (p. 3). Later in the book, Lee Smolin returns to this theme. His "What is Time?" considers the differences between absolute and relative time from Newton to Einstein and general relativity. W. Daniel Hillis concludes the collection with "Special Relativity: Why Can't You Go Faster Than Light?"

In "Three Facets of Evolution," Stephen Jay Gould clearly explains (a) what evolution is not, (b) what it is, and (c) why we should care. "Previous explanations were . . . either untestable . . . or arcane and complex. . . . Evolution's explanation for the natural system is . . . stunningly simple: Relationship is genealogy . . ." (p. 12). Steve Jones continues the discussion of Darwinian evolution by grappling with the question "Why Are Some People Black?" Offering no simple answer, he instead explores the various reasons that have been given over time for the differences in skin color among the peoples of the earth. Darwin's ideas likewise inform "How to Think What No One Has Ever Thought Before," William H. Calvin's look at the relationship between consciousness and our brain. How is it that we can "say something we've never said before—and it doesn't come out as garbled as our dreams?" (p. 29)

By their brevity, these essays lend themselves to a thoughtful reading in a short time, perfect for a bus or train ride. By their clarity, they make a good gift for friends and family who are not familiar with science.

In 1996, the publishers put out about fifty such small paperbacks, most of which are abridgments like *Science, Mind & Cosmos*. They cover a diverse range of subjects, from history and science to fiction and poetry. Among the other science titles are *Natural Selection* by Charles Darwin, *God's Utility Function* by Richard Dawkins, *Human Origins* by Richard Leakey, and *Sophie's World: The Greek Philosophers* by Jostein Gaarder. □

Monty Vierra teaches English in Taiwan.

TOPICS
Misuse of Archaeology
Misuse of Psychotherapy
Why the Alternative "Paradigm"?
Misuse of Evidence on the Right and the Left

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Yes, We Have No Hosannas

RALPH ESTLING

I think it's time we discussed the purpose of life, or if you prefer, the Purpose of Life.

I've noticed it's always a lot easier to come to firm decisions when we are ignorant. Once we start to learn something, things tend to become more complicated and truth becomes much more difficult to come by. Not a very profound or original observation, but still one worth bearing in mind when we find ourselves or others speaking *ex cathedra*—about life and its meaning, for example, and things like that.

Take the origin of life. I venture the opinion, based largely but not entirely on ignorance, that life is a self-generated phenomenon. Some would go on from this to say it must then be an accident, but I'm not sure this necessarily follows.

It seems that life might be an inescapable consequence when chemical reactions involving carbon and a few other things reach a certain critical complexity. Not enough is known about this for us to be sure either way, but I've always felt that the need to involve "higher" forces in the process, beings who deliberately and knowingly bring life about through an act of their will, is an extraneous intrusion. It forces us to the certainty that life cannot evolve from nonliving substances acted upon by ordinary chemical processes, and I don't believe we have any cause to be so sure of life's inability to start itself going, when conditions permit. Such an inability runs counter to the whole course of evolution and all we know so far about biology, as does the need for an external first cause.

Having lost the breast, we need the universe as our pacifier. I can't help thinking we can do better than this.

It's much simpler to believe, until we have some reason not to, that life is a natural development and not something so unusual and extraordinary that we need to invent divine or, as Fred Hoyle would have it, merely very superior beings to account for it. Life's ordinariness would mean that it's a common enough occurrence in the universe, and this should serve to keep us from looking upon ourselves with too rapturous an eye, always a dangerous thing to do in a cosmos full of nemesis and comeuppance.

Life's ordinariness keeps our self-esteem in check, gives perspective. Humans have a hard time keeping perspective, holding a tight rein on egocentricity. Even the gods we invent must be vitally concerned with human welfare, to the extent that they create the universe and thereafter maintain it in good working order for our sole benefit, something I can't help finding a bit suspicious, a bit too much like a small child's view of things as existing solely for his or her consideration. If we grow out of this latter attitude, why don't we grow out of the former one? The human race, both collectively and individually, seems able to mature only so far and only in so many directions, and then it stops.

So I wonder what will happen. Will attitudes and outlooks change in any decisive way once scientists are able to create living organisms, which I think might happen some time in the next century (if we don't count Dolly the sheep)? Of course one way of avoiding the issue is to argue that such a thing will forever remain impossible and beyond our ability. But the danger, the nemesis, is precisely for those who *do* argue for the impossibility of there ever being man-made life. How will they feel when it happens?

We have historical examples. How did people feel when Copernicus said Earth might not be the center of Creation? How did we feel when Darwin said that perhaps humans were not divinely manufactured? We didn't like it, but very quickly we swallowed it, bitter medicine that it was, and then carried on as if nothing had happened. Humans,

Ralph Estling writes from Ilminster, Somerset, U.K.

individually and collectively, were still the most important physical entities in existence. It's this egocentric, anthropocentric core of our beliefs that bothers me and makes me suspect all man-made divinities and their doings. Our gods cater too much to our little existences. And we remember our own infantilisms, our own certainties at the age of three that the world and everything in it were there to please and to attend to us. Having lost the breast, we need the universe as our pacifier. I can't help thinking we can do better than this.

But without gods to care for and about us, won't life lose its meaning, its purpose? Not only the devout but existentialists as well have decided it must. As someone said, Sartre never forgave God for not existing, just as some people never forgive their mothers for having weaned them. That's the danger of believing in things as tenuous as gods: once we lose them, we're inclined to go to pieces and decide that life is pointless, absurd, not worth having. But somehow the grownups among us go on to make their own points to their own lives, even without the gods, even without Jean-Paul Sartre. The normal four-year-old begins to suspect that the universe doesn't exist for him. Why do we find it so difficult an accomplishment? Life doesn't become purposeless just because we don't own the universe. And anyway, what would we *do* with the universe!

One hundred years ago Mark Twain tussled with this problem, humankind as consummate purpose of the universe: "If the Eiffel Tower were now representing the world's age, the skin of paint on the pinnacle-knob at its summit would represent man's share of that age; and anybody would perceive that that skin was what the tower was built for. I reckon they would. I dunno."

A century on and I still reckon they would. Maybe they wouldn't. I dunno.

The Courtney Brown Affair and Academic Freedom

SCOTT O. LILIENFELD

Academic freedom—the right of faculty members to pursue and discuss whatever interests they wish, no matter how outlandish or repugnant others might find them—is a cornerstone of institutions of higher learning. Without it, the very rationale undergirding that remarkable democratic organization we call a university crumbles. Nevertheless, there are inevitably times when academic freedom conflicts with a university's best interests. When this occurs, vexing pragmatic and ethical questions arise.

A prominent example of this conflict involves Courtney Brown, an associate professor in the political science department at Emory University, where I am also a faculty member (in psychology). Brown's actions and words have, to put it mildly, aroused considerable ridicule and controversy at Emory and in the broader academic community. In his new book, *Cosmic Voyages: A Scientific Discovery of Extraterrestrials Visiting Earth*, Brown claims to use powers of "remote viewing" (an alleged psychic ability permitting individuals to "see" objects at enormous distances) to visit Mars and observe the actions of aliens. He purports to have uncovered indisputable evidence that two races of extraterrestrials, Martians and Greys, left their home planets centuries ago and have taken up residence in the dark recesses of Earth.

But Brown does not stop there. His remote viewing methods, which are "as rigorously controlled as those used in any solid social science text," have revealed that Adam and Eve were architects of a genetic engineering project and that numerous *Star Trek* episodes were written with the assistance of aliens. In one of the book's more remarkable chapters, "The Grey Mind," Brown claims to have "entered the mind" of an extraterrestrial and investigated its psychological make-up. Brown, who directs the "Farsight Institute" in Atlanta, offers seminars—at a cost of $3,000 per head—that promise to provide attendees with the psychic abilities he has mastered.

One hardly knows where to begin. Brown's book is remarkable for its virtually complete absence of any data that would qualify as scientific by even the most liberal evidential standards. His "findings" consist entirely of unverified subjective experiences, and the reader searches in vain for anything vaguely resembling a controlled experiment. Brown neglects to mention either the results of a recent government-appointed scientific panel on remote viewing, which concluded that "evidence for the operational value of remote viewing is not available, even after a decade of attempts," or the critiques of Ray Hyman, a psychologist at the University of Oregon, who has shown that the scientific evidence in support of remote viewing is seriously

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flawed. Philosopher David Hume maintained that extraordinary claims require extraordinary evidence; Brown's evidence is, to be charitable, singularly unimpressive.

In light of Brown's claims, I recently challenged him to a test of his alleged psychic abilities. I proposed that he appear at a meeting of my undergraduate seminar Science and Pseudoscience in Psychology, where my students and I would subject him to a simple controlled experiment examining his capacity to remotely view stimuli in an adjacent room. I assured him that he would have considerable input regarding the selection of stimulus materials and agreed to publicize the results of this test in both of Emory's two newspapers, regardless of its outcome.

But Brown categorically refused. His reasoning was curious: In his e-mail response to me, he asserted that "tests of the type you have talked about are very old hat" and that the current status of remote viewing "goes light-years beyond that which your letter suggests." But if Brown's psychic powers are as advanced as he claims, shouldn't he be able to pass an elementary test of these powers with flying colors? Brown also declined my offer on the grounds that he did "not want to drag Emory into [his] other activities" and that he is "rigorous about not mixing what [he does] elsewhere with what [he does] at Emory."

This rationale seems disingenuous at best. If Brown did not wish to involve Emory in his exploits, why did he list his academic affiliation with Emory in his book and on his web site? Brown apparently wants to have it both ways: He publicizes his association with Emory when it might afford him the imprimatur of academic legitimacy, but refuses to submit to scientific tests by Emory colleagues on the grounds that he does not wish to "drag Emory" into a firestorm of controversy. But it is too late: Emory's reputation has already been besmirched. As George Armelagos of Emory's Department of Anthropology notes, "Brown is naive if he believes his fantasies do not affect the image of the University."

Why should we at Emory care about Brown? Many of his Emory colleagues will surely suggest that he is best ignored. But such an attitude would be misguided. As the late Carl Sagan argued in his 1996 book, *The Demon-Haunted World*, the public's inability to think critically about scientific issues is an unappreciated source of our educational and social woes.

By remaining silent on Brown's shenanigans, we do our students, who desperately need role models of clear reasoning, a serious disservice. Moreover, we leave ourselves open to criticisms such as those of Robert Baker, psychologist at the University of Kentucky, who has suggested that the Brown affair "bring(s) into question whether Emory has any high scientific standards."

So how should Emory respond to Brown? I would argue that Brown's academic freedom be protected unconditionally and that we defend his right to pursue his interests without threat of official sanction or penalty. Nevertheless, academic freedom also gives Brown's colleagues license to criticize him openly. It is incumbent on qualified Emory faculty to inform the public that Brown's assertions are scientifically irresponsible and that his money-making ventures and refusal to submit himself to independent tests of his paranormal claims are ethically reprehensible.

Academic freedom, like all freedoms (e.g., the right to vote), becomes meaningless when not exercised. Let us not forfeit it at a time when Emory's reputation as a serious institution of higher learning is being challenged.

* * *

See also Martin Gardner's review of Courtney Brown's book Cosmic Voyage *on page 14.*

A Statement about Professor Courtney Brown

The following is the slightly abridged text of an open letter from William M. Chace, president of Emory University:

Professor Courtney Brown is a member of the Emory faculty and teaches in the Department of Political Science. His published work in social science has received very favorable recognition from experts in the field. Independently of this professional work, he has recently established and runs the "Farsight Institute," an organization having no relationship whatever with Emory University, and from which it receives no support. Professor Brown has declared that he will not commingle his responsibilities at Emory with this other activity. To the best of our knowledge, he has honored that pledge. Under these circumstances, he is free to pursue his endeavors with his institute.

The principles of academic freedom, as well as the liberties granted to all American citizens, do not permit this university or any other university to constrain the ideas or opinions of any of its faculty members. . . . Universities do not exist to shelter received opinion or to affirm what everyone knows. They serve instead to stimulate originality of thought and independence of expression. Since error is often the companion of truth, and since truth is always to be sought yet never to be gained, universities have always had an intimate acquaintance with falsehood.

While I do not agree with the content of Professor Brown's non-Emory activities, he certainly has the right to pursue them.

—William M. Chace

UAB Final Report of Therapeutic Touch—An Appraisal

BELA SCHEIBER and CARLA SELBY

Therapeutic touch (TT) is a modern variant of the ancient "laying on of hands." Ironically, this new version involves only incidental touching while the practitioner passes her or his hands over the patient's body at some distance from it in an attempt to "unruffle" the person's energy field. While the existence of a human energy field has never been scientifically demonstrated, practitioners talk and behave as if it is a fact. Founder and chief promoter of TT Dolores Krieger, has said, "My only concern when doing Therapeutic Touch is the person's energy field" (*Massage*, January/February 1994).

Infrequent attempts have been made to subject the claims of TT practitioners to some scientific rigor. None have been as ambitious as those undertaken recently at the University of Alabama at Birmingham (UAB) Burn Center. Principal Investigator Joan Turner, DSN, RN, CIC, undertook the challenge by proposing to study the effect of TT on pain and infection in burn patients (see our article "Science or Pseudoscience? Pentagon Grant Funds Alternative Health Study" in SKEPTICAL INQUIRER, July/August 1996). After an eighteen-month investigation at a cost of $355,225 to taxpayers, UAB has delivered its "Tri-Service Nursing Research Grant Final Report" to the Uniform Services University of the Health Sciences, a division of the Pentagon. The Rocky Mountain Skeptics submitted an FOIA (Freedom Of Information Act) request for this document after trying unsuccessfully to obtain it from the principal investigator. She had refused to provide us with a copy of the report and also informed us that she would ask the Pentagon not to give it to us since she was writing an article for publication. Fortunately, the Pentagon has a better idea of what is appropriate with scientific data.

CSICOP-Rockies has formed the Committee for the Scientific Evaluation of Therapeutic Touch (CSETT) in Boulder, Colorado. Members include: Dale Beyerstein, Ph.D.; Vern Bullough, Ph.D.; Saul Green, Ph.D.; Scott Replogle, M.D.; Wallace Sampson, M.D.; Bela Scheiber, Vice-chair; Carla Selby, Chair; Leland Shapiro, M.D. Building on the past work of committee members, the group's focus will be on confronting TT claims.

Of the two pages comprising the final report, nearly one full page is devoted to "Problems Encountered." This section deals predominantly with a peripheral issue: ". . . publicity and harassment by a religious group called the Watchmen. . . ." This lengthy inclusion of gossip within an ostensibly scientific report is baffling. Proponents of TT must be aware of religious opposition to their activities on various grounds. Why a substantial fraction of their research discussions should be devoted to an attempt to discredit religious interference demonstrates the political and sociological controversy surrounding TT, not the scientific content of their activity.

When this project was announced, it was touted as a scientific effort to demonstrate the efficacy of TT. As we wrote in response to correspondents to our July/August 1996 article (Letters to the Editor, *SI*, November/December 1996), when we reviewed the research proposal, we became fairly certain that credible scientific results could not be anticipated from a research design that appeared to have been constructed merely to vindicate TT. Curiously, the report does not state any clear and meaningful conclusion, and yet the author writes: "Additional research is currently being conducted to assist us in *arriving at a maximal protocol for the administration of TT to subjects*" (emphasis added). Also, in the final paragraph she writes: "Therapeutic Touch is a nursing measure which is non-pharmacologic and produces no side effects. This therapy can be used to decrease subjects' perception of pain as either a one time or series of days intervention." None of this can be concluded from this study.

Also in our response, we expressed our concerns that the outcome would inevitably be presented as supportive of TT due to the open-ended, poorly defined experimental design. The final report does not say how many outcomes were evaluated and what criteria deter-

mined those that were included. If many potential outcomes were considered, random selection alone could have produced statistical significance. The report says that pain measured at day three was significantly reduced by TT (p=0.038). What are we to conclude about any of the other five days? Nor does it provide any evidence that statistical adjustment for multiple comparisons was considered.

While the Visual Analogue Pain Estimation Scale (VAS) showed no statistical difference in subjective pain perception between the TT and sham groups, the results were significant when measured by the McGill scale, both measured on day one versus day six. It is possible that this inconsistency can be attributed to random positive results for the McGill scale due, once again, to multiple comparisons without proper statistical adjustment. Otherwise, it is unclear why two measures of the same effect produced different results.

The original design called for 150 burn patients, each randomly assigned to either the TT or sham group; only 131 were actually recruited. Additionally, ". . . not all of these subjects actually remained in the study for the full six-day period." Who dropped out and why? What was the distribution between the TT and sham groups? Were the clinical characteristics of the dropouts from the two groups comparable? No charts or tables are included in the final report, thus precluding any independent evaluation of complete data. This information is crucial as it is essential to know whether the experimental and control groups were balanced regarding relevant clinical variables. For example, did one group or the other not contain more seriously ill patients? The inadequacy of the report underscores a lack of understanding of experimental design required to demonstrate validity of an hypothesis.

In our article, we raised concerns about the use of "mimic TT as a control." Since the intention to heal is held out as a vital component of TT, we raised the question, "What if the mimic TT practitioner feels compassion for the burn patient and accidentally performs actual TT?" Since the human "energy field" (presumably manipulated by TT) cannot be objectively quantified, there is no independent means to assess when manipulation is occurring. The final report states: "The greatest lesson learned from this process is that the inclusion of a true control group in addition to a sham and treatment group is required because a strong placebo effect occurs from the special attention given to patients in the 'sham' treatment." This observation is correct in its characterization of the placebo effect on patients participating in any such experiment. No practitioner or test of TT has shown that anything other than the placebo effect is taking place. The UAB study continues to support this assertion.

(To obtain documents of the proposal and its final report refer to the following web site: http://www.parascope.com/articles/1196/touch1.htm. Other documents are also available at rmscentral @aol.com.) □

Bela Scheiber is executive director of the Center for Inquiry–Rockies, and Carla Selby is associate director of the Center for Inquiry–Rockies. *Grateful acknowledgment goes to Leland Shapiro, research scientist at University of Colorado Health Sciences Center.*

FRINGE-WATCHER

from page 15

experiment on us to find out how to improve our genes. He is convinced, so help me, that the Greys have been invading the sleeping minds of writers who produce scripts for *Star Trek: The Next Generation*. These writers are totally unaware that their clever ideas are designed by the Greys to accustom Earthlings to the reality of extraterrestrials eager to transform our culture.

The time is growing short. Brown urges our government to abandon its stupid policy of secrecy and openly seek contacts with the Greys and Martians.

The only earlier book about UFOs I can think of that is nuttier than this one is George Adamski's *Inside the Space Ships* (1955). As an abductee aboard a UFO, Adamski describes bustling cities on the far side of the moon. Adamski, of course, was a charlatan, whereas Brown actually believes what he writes. Both books read as if they were efforts at science fiction written by a ten-year-old.

Emory University must be enormously embarrassed by having Brown on its faculty. Like Harvard's problem with Dr. Mack, they can't fire Brown because he has tenure, and Emory's president believes in academic freedom for its teachers. (See "A Statement about Professor Courtney Brown" by Emory president William M. Chace, in the Forum section, this issue.) The editors at Dutton, who know that Brown's book is pure baloney but are hoping for huge profits, should be, but probably are not, deeply ashamed of their greed.

In a recent interview in the *Kansas City Star*, Brown said that if NASA's planned Martian probes fail to show evidence of a Martian civilization, his career in higher education will be kaput. The 1994 probe that vanished a few days before it was to orbit the red planet to take pictures, Brown is convinced, was shot down by the Martians, who don't want to be observed!

"All the prestige that I've got is resting on whether there is anything in this," Brown told the reporter. "I'd be crazy if I went public with something like this without being certain about what's going on. . . . I'd be dead as an academic. I couldn't even get a letter published in Dear Abby."

It is a sad story of an intelligent, sincere man who has turned himself into a gullible dunce. It will be amusing to see how he reacts a few years from now, after the Martian probes find no traces of an advanced Martian civilization.

(See also the Forum column "The Courtney Brown Affair and Academic Freedom" by Scott O. Lilienfeld, this issue.)

* * *

The promised part 2 of Martin Gardner's column about Koran numerology will appear in our next issue.

The Darkened Cosmos II:
More Tributes to Carl Sagan

We continue the tributes to Carl Sagan begun in our last issue.

—THE EDITOR

Bill Nye

Professor Carl Sagan had the whole lecture hall looking down on a small organism that was ingesting tiny creatures for sustenance. Well, it turned out we were looking at a picture taken from a satellite of a swimming pool. The ingested creatures were swimmers—people like us.

Professor Sagan had a way of surprising you. He could do it, because he had an intimate knowledge, perhaps deeper than anyone else we'll ever meet, of how one part of the world connected with the rest of the cosmos. He described our universe with words like "elegant, exquisite, and astonishing." And, it is. He made you feel it.

Many of us think of him as a popularizer of science. Bear in mind he was also a topnotch scientist, as well. He predicted the atmospheric physics of dust storms on Mars. He alerted the world to the catastrophic changes in Earth's climates should we recklessly allow an exchange of nuclear weapons. And, he tirelessly checked the purveyors of pseudoscience in steady, compelling essays and debates.

I met him a few times over the years after I took his astronomy course. Each meeting left me refreshed with a new and more intimate understanding of what we had discussed. It came from his easy, deep, and passionate grasp of things. I was always a little awed after each exchange.

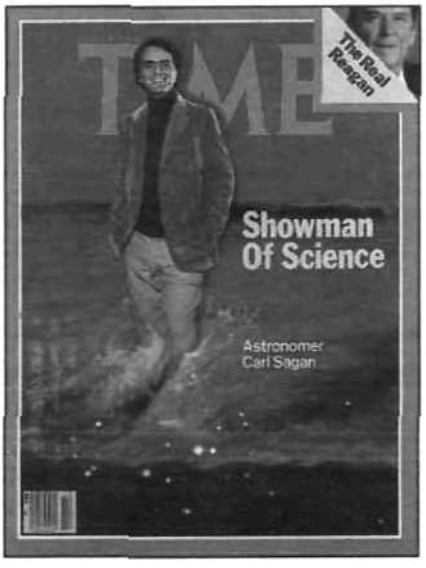
He lived at a time when human exploration of space was, for the first time in human history, revealing to us the true nature of Nature. From his boyhood, Carl Sagan not only embraced this new awareness, he understood its significance in a way that most of us don't. He often said, "We are all made of star-stuff," an astonishing idea. He encouraged you to prove to yourself that it was true. His presence as an orator was compelling, his writing is riveting, and his influence on the world's appreciation of science is hard to reckon. It's big; he will be missed.

Bill Nye, who took Introductory Astronomy from Carl Sagan in 1977, is now "The Science Guy" on public and syndicated television.

Leon Jaroff

Carl's imagination and creativity were boundless—and grist for journalists. My first contact with him was in the late '60s, after Mariner 9, in orbit around Mars, had sent back the first close-up pictures of the Red Planet. Instead of the hoped-for signs of civilizations past or present, the pictures showed what seemed to be a bleak, lifeless surface marred by craters. Young Carl, ever the optimist, promptly wrote a paper reporting that he had scanned thousands of weather satellite pictures of Earth, and on only one of them had he spotted any evidence that intelligent life might exist on Earth. Thus, civilizations might well be thriving on Mars, he suggested, just a little beyond the resolution of Mariner's camera. My story in *Time* magazine, based on an interview with the then little-known Carl, was entitled "Is There Life On Earth?"

Not long afterward, Carl turned his attention to Jupiter and held out the possibility that life could exist on the gas



giant. How? In the form of creatures composed largely of gas bags and floating freely in the Jovian atmosphere. That hypothesis, made perhaps with tongue in cheek, was also too much to resist. My *Time* story was entitled (appropriately) "The Gas Bags of Jupiter."

Over the years, I hounded Carl for stories and seldom came up empty-handed. He was patient, courteous, friendly, and always seemed flattered by my interest. His explanations of difficult concepts were lucid, his quotes lively, and his insights unique. In short, he was a science writer's dream source.

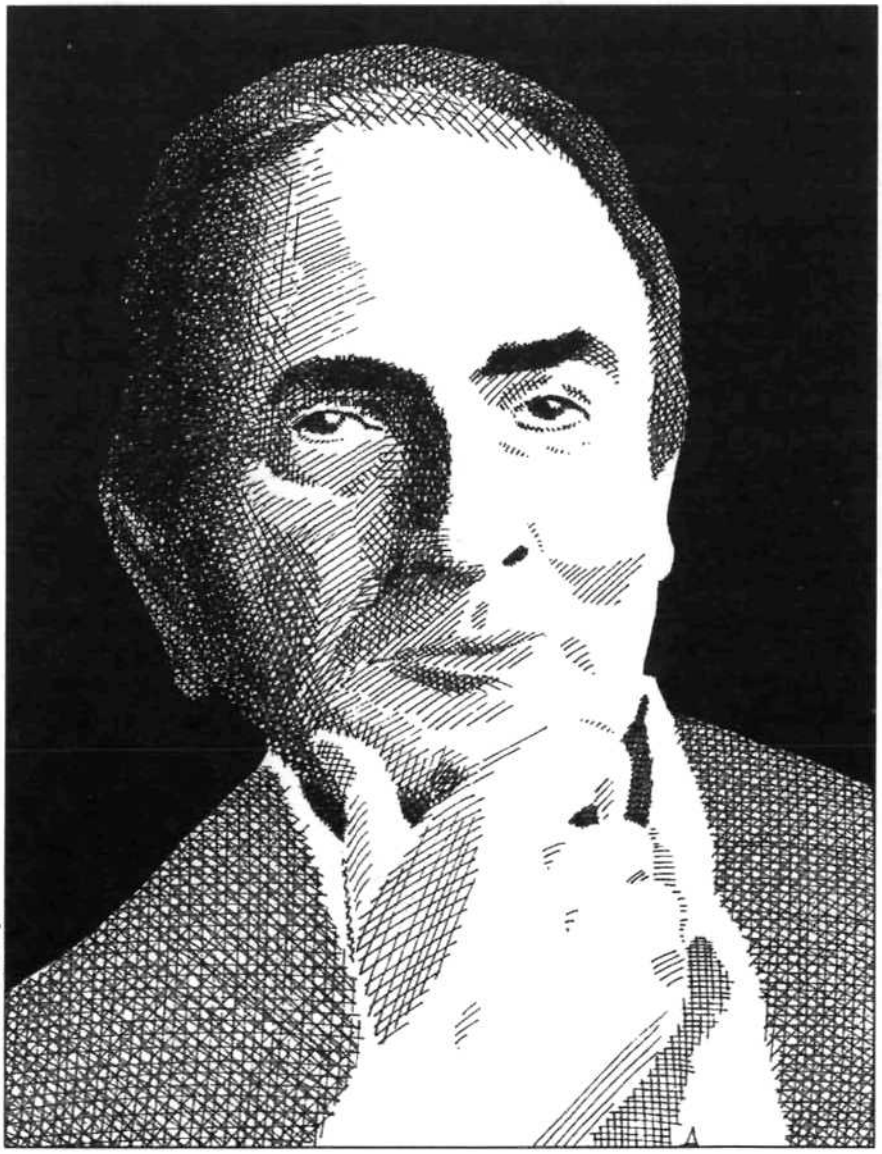
When I last saw Carl at his sixtieth birthday celebration in Ithaca, he seemed a happy, fulfilled man. He had reason to be, secure in the knowledge that he was admired around the world as science's most articulate and imaginative spokesman.

What a loss.

Leon Jaroff was a senior editor and the science editor of Time, *for which he still writes, and the founder and first managing editor of* Discover.

Neil deGrasse Tyson

The following is a eulogy for Carl Sagan (edited slightly) that was delivered by Neil deGrasse Tyson at a February 27 memorial service held at the Cathedral of St. John the Divine in New York City. Other speakers included Sagan's wife, two of his children, Stephen Jay Gould, and Vice President Al Gore.



H. Alonso Alvarez de Araya

What can I say about Carl Sagan that has not already been said?

Carl Sagan was at the helm of many ships. But the one I have in mind carries people, who, as part of life's priorities, seek to enlighten the public about the beauty of science. Collectively, all of us on this ship deliver lectures, write books, and give interviews with the media. But for each engagement, somehow we know that Carl has been there before—if not in person then in spirit. He has made our work easier, having painted the landscape that now frames our efforts to reach the layperson. I cannot count the number of times I have jump-started an encounter with the public by directly or indirectly referencing a jeweled quote from one of his many literary or media expositions on the universe. With Carl's passing, I now feel that sense of insecurity reminiscent of when you first leave home. I feel not only the loss of a friend but the loss of a leader.

I first met Carl when I was in high school in the mid-1970s. My letter of application to Cornell University was dripping with an interest in the universe. The admissions office, unbeknownst to me, forwarded the application to Carl Sagan's attention. Within weeks I received a personal letter from Carl, inviting me up to Ithaca to visit him. . . . I visited Carl on a snowy afternoon in February. He was warm, compassionate, and demonstrated what appeared to be a genuine interest in my life's path. At the end of the day, he drove me back to the Ithaca bus station and jotted down his home phone number—just in case the buses could not navigate through the snow and I needed a place to stay.

I never told him this, but at every stage of my scientific career that followed, I modeled my encounters with students after my first encounter with Carl.

Although I did not ultimately attend Cornell University, Carl and I re-met several more times over the years. . . .

I last saw him at his sixtieth birthday

celebration at Ithaca. An entire evening was spent by friends, loved ones, and colleagues, heaping praises upon Carl. Each testimony was grander than the next. There was the undergraduate who majored in science after a single encounter with Carl. There was the graduate student who shifted his thesis focus to planetary atmospheres upon becoming excited by the science that Carl had described to him. There was the letter to Carl (read by the Astronomy Department Chair) from a student in Africa who launched an astronomy club in his home village after reading *Cosmos*. Topping that moment, the department had actually flown the student to Ithaca for the occasion and introduced him to Carl in person. Then there were the letters read from top officials of international governments. And then there was the announcement that an asteroid would be named after Carl's wife, Annie Druyan, whose orbit was in eternal resonance with another asteroid that had already been named for Carl.

The praise seemed unending, which led me to ask myself whether the life of any human being could be worthy of this much praise. The next evening, Carl gave a public talk to a standing-room-only crowd in Cornell's Uris Auditorium. His topic was inspired by the contents of his recent book *Pale Blue Dot*. During the hour of his talk, and the hour that followed of questions he fielded from the audience, I realized that the praise I had witnessed the night before was only the beginning of the praise that he truly deserves—and will continue to receive.

I will miss him.

Neil deGrasse Tyson is the Frederick P. Rose Director of New York City's Hayden Planetarium. He is also a visiting research scientist and lecturer at the Department of Astrophysics, Princeton University.

James Oberg

Sagan's greatest gift, which enriched and rewarded us far more than it did him, was his transparent enthusiasm to "find out and tell about" the advance of human understanding of the universe. He vividly humanized what had been previously regarded as cold-blooded "scientific curiosity"; and in advertising science "with a human face," he brought all the strengths and weaknesses of a human being onto the stage. For all of us exposed to his messages, he encouraged our fervent hope that the human intellect, with all of its inefficiencies and distractions to which none of us are immune, could still come to understand, bit by bit, the incomprehensible universe.

James Oberg is a science journalist and space engineer in Houston.

E. C. Krupp

Only three astronomers have appeared on the cover of *Time* magazine, and Carl Sagan was one of them. Such spotlighting in the national media was not his greatest triumph, but it makes his impact very clear. When he went dipping his toe in that cosmic ocean, he took a huge crowd with him. Anyone who advocates the democratization of knowledge has to be grateful. He showed us there is romance and adventure in the disciplined, systematic acquisition of knowledge.

With an imaginative reach anchored in rational thought, he brought the stars down to Earth and persuaded its inhabitants to examine their connection with the cosmos. He wasn't Man of the Year, but he spoke for Earth.

E. C. Krupp is director of Griffith Observatory in Los Angeles.

Jerry Hosmer

As a science educator, I know I speak for many in my profession when I try to express how greatly Dr. Sagan will be missed. I believe he did more to encourage young people to seek out knowledge and truth than anyone else in the last thirty years. He made science "cool" and inspired not only students but many teachers as well. Carl Sagan will not soon be forgotten.

Jerry M. Hosmer teaches chemistry and is chair of the Science Department at Poplar Bluff R-1 School District in Poplar Bluff, Missouri.

Dave Larson

I've been thinking a lot about Carl Sagan the last few weeks. He never knew me, but he saved my life, and I never got to thank him. I was a screwed-up kid in the late '70s. I was a high school dropout who spent too much time partying and none building a future. I was on the fast road to nowhere and badly in need of something larger than myself to give my life direction. Then came *Cosmos*.

As a child I had been fascinated by science and in awe of the starry sky, but somehow I lost sight of it in the confusion of growing up. Then Carl Sagan brought it back to me. He gave me back my sense of wonder at the mystery of the universe—something I wasn't even aware I'd lost. After viewing the series, I received a copy of the companion book from a friend. I stayed up for two days reading it, then began to buy and read his other books as he published them. Gradually, I began to see the world in a different way and make changes in my life. I quit partying all the time, read everything I could get my hands on in the way of general science, and even worked through a few "Teach Yourself" books on astronomy, physics, and other subjects. I hadn't had math or advanced science in school, but I was encouraged by my understanding of Dr. Sagan's explanations. It took several years, until the late '80s, but I finally got around to trying college. A few years ago I earned a B.S. in physics.

I intended at the time to pursue graduate study in astronomy, following in the footsteps of the master, and I hoped to

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study directly with Dr. Sagan; but I had to leave school for a while to make some money. Still, I thought I might one day get a chance to sit in his classroom. I would have liked to hear him describe in person the billions of stars in the universe, to hear his eloquent speech without the limitations of television, to tell him how much his teaching meant to me, to say thank you, but I guess it wasn't to be.

I wasn't even aware that he was ill until I heard of his death. It really shook me up. For several days I kept thinking of him and how the world had lost some of its heart, how science had lost its greatest champion. And slowly I began to realize a loss of a more personal nature, of something I didn't even know I had. A Hero. Hero worship has always put me off, but it is now apparent that I've had a hero for years. This man has been my hero. This man, who never knew me, but saved my life, and whom I never got to thank. Well, Carl Sagan, thank you. I never sat in your class, but you were my greatest teacher. There may be billions of stars in the universe, but few have shined as brightly as you.

Dave Larson currently works in telecommunications in Rowlett, Texas. He hosts a web site dedicated to the advancement of science at http://web2.airmail.net/dlarson1/science.

Mike DiMuzio

Carl Sagan was a person I long admired. I, like Carl, had become fascinated with astronomy at a young age, only about four years old. Recently, I hoped that he was looking forward to the launch of the Cassini probe to Saturn, considering his particular interest in its moon Iapetus.

Now he is gone. I do not believe in an afterlife; however, I feel we can achieve a type of immortality through others. As long as we speak, read, and think of what Carl Sagan spoke, read and thought, then he will be alive forever in our thoughts and our hearts.

As long as I am alive, I will remember him. I believe that I will not be alone in this. And, long after we are gone, I hope there will be a new generation of children inspired by *Cosmos*, *Broca's Brain*, and even *The Demon-Haunted World*.

Goodbye, Carl . . . you beat all of us to the stars.

Mike DiMuzio is Planetarium Lecturer and Observatory Director at Youngstown State University's Ward Beecher Planetarium.

Al White

Sagan's Sonnet
(July 4, 1996)

The deep wrought-iron July sky
was that evening briefly ablaze. Mostly
and most briefly with rockets thrown
in a deliberate craze of patriot novae—
syncopated concussions, overloaded
brains
in faint choral echo. Less so (but not
so less)
winged neurons whizzed past ears
in Permian blood-lust. Hands clapped
in adaptive patterns as rocket launch
or needled proboscis insisted. Almost
unnoticed
Jupiter's constancy in the southeast
brought you
to mind; just this one. So nanobits of
strontium
and carbon valence burn, slow and
warm,
hot and fast, filled a deeper sky with
form.

V. Alan White is a professor of philosophy and the 1996-97 Carnegie Wisconsin Professor of the Year, University of Wisconsin Centers.

Following is just a brief sampling of other letters received from readers.

The death of Carl Sagan has left the world a poorer place. His contributions to society have been prodigious and will be considered even more so when social historians of the future assess his overall beneficial impact upon a civilization in dire need of the "big picture" perspective. He was only sixty-two years old at his death in December of 1996, and I worry that without another twenty years or so of his typically consummate and compassionate rationality, there might not even be social historians of the future in a position to render appropriate judgment at all! Perhaps an overstatement, perhaps not.

Our survival as a dominant species on this planet has depended upon and will increasingly require the application of rational thought, often best exemplified through the scientific method. Our progress is threatened by ignorance and superstition, particularly under the guises of fundamentalist religious dogma, creation "science," astrology, New Age channeling, and numerous other silly pseudosciences. Sagan, in his gentle way, extracted the best from the scientific method, combining it with a true morality filtered from the Judeo-Christian ethic, delighting all those of open mind and goodwill who read his works or heard him speak.

I will miss the articulate exuberance with which he celebrated the wonders of our cosmos and his stern but sympathetic admonitions against those of us who would succumb to easy preconceptions about ourselves and our world—in the process engendering some short-term emotional comfort but, in the long run, only erecting obstacles to deeper understanding. He was without question one of history's greatest proponents for scientific advancement, a magnificent ambassador of knowledge, teaching us along the way that, without the deep data provided by rigorous application of the scientific method, we make ourselves vulnerable to charlatans and shallow "experts" offering glibly authoritative answers to profoundly difficult questions. Philosophically, he was a strong logician, but his approach to teaching was a bit whimsical, even spiritual, and always honest.

Carl, I will miss your newest books and articles, your appearances on television and, especially, fundamentally, your

good-humored and incisive courage in dealing with the phony pseudoscientists and fuzzy thinkers abounding in our culture. I hope some of us can carry your shining torch.

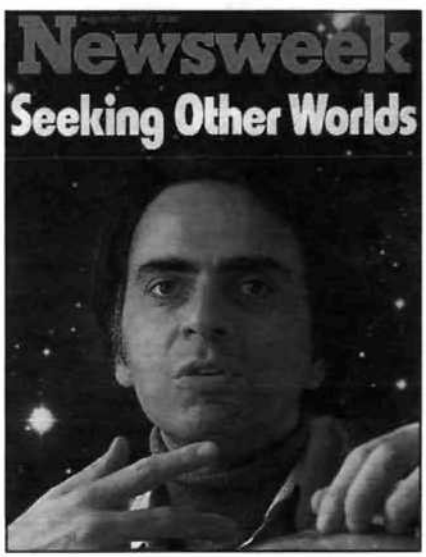
Evan Thomas
Twin Falls, Idaho

In 1994 I had the privilege of meeting and talking with Dr. Carl Sagan, when he delivered the keynote address at the CSICOP conference in Seattle. As a fan of Dr. Sagan's since I watched him on *Cosmos*, I was enormously flattered at having him compliment me on a question I asked at the conference.

When I heard he was ill, I sent him a get-well card at Cornell University. Unfortunately, I have no idea whether he received it. Only a month or so ago, I was so happy to hear that he thought he was getting better. Now he is dead, and coincidentally, that same day I received a call from the local library to say that the long-awaited copy of *The Demon-Haunted World* was ready for me to pick up.

So I've decided to remember Dr. Sagan in a way he'd be sure to enjoy: by making a contribution to CSICOP's Center for Inquiry, and by devouring his last, fascinating book.

Barbara-Anne Eddy
Vancouver, B.C., Canada



Carl Sagan was one of the few public figures on this planet who made you proud to be a member of the human race. It takes little imagination to realize that your magazine will be inundated with letters mourning the loss, and while at the moment it does little to relieve the sorrow, it is a comfort to acknowledge the legacy he has left us.

By coincidence, when I heard the news I happened to be rereading his marvelous book *The Dragons of Eden*, still a masterpiece of informed speculation. My eye fell on one paragraph in particular that I think sums up what I most admire in Carl Sagan, and it also encapsulates my own feelings:

> In a way, science might be described as paranoid thinking applied to Nature: we are looking for natural conspiracies, for connections among apparently disparate data. Our objective is to abstract patterns from Nature . . . but many proposed patterns do not in fact correspond to the data. Thus all proposed patterns must be subjected to the sieve of critical analysis. . . . The search for patterns without critical analysis, and rigid skepticism without a search for patterns, are the antipodes of incomplete science. The effective pursuit of knowledge requires both functions. (*Dragons of Eden* 1977)

Ross Sargent
Folkestone, Kent
U.K.

I am just a regular guy who likes to read and think. But the passing of the great Carl Sagan is a horrible loss. I bought his book *Shadows of Forgotten Ancestors* in November 1992. I could not believe how much scientists knew about evolution. Before this book, I had only a very vague idea of evolution.

It opened my eyes to the true story of life on this planet and caused me to read many other books and discover my favorite science writer Richard Dawkins. Explaining science without dumbing it down takes brilliance, and Carl Sagan was one of the best: along with Dawkins, Stephen Jay Gould, and Isaac Asimov.

When I think about all those other books I have read and continue to read—all the pleasure of learning—I have to thank Carl Sagan for his impact on my thinking. He never knew me, but in every sense he was my teacher. I can't get the point across strongly enough. Thanks to Carl Sagan for getting me thinking and interested in science and philosophy. I love him for it.

Dan Schuelke
Alta, Iowa

Universe Man

(In Memory of Carl Sagan)

Take me on a trip to the stars
Melt me into Mercury
Mold me into Mars
Take me to where it all began
Oh won't you take me, Universe Man

Your brain was big as Jupiter
Your passion blazed like Venus
But I never felt the stupid-er
In the presence of your genius

Your need to know was infinite
Your energy contagious
You lifted me outside myself
and showed me something ageless

There are millions of planets above us
Ev'ry one with a different hue
And billions of stars in the heavens
But, Carl, there was only one you

Now nothing can keep you grounded
Not even gravity's hand
At last you're free, for you get to be
One with the universe, man

Take me on a trip to the stars
Melt me into Mercury
Mold me into Mars
Oh, to be where it all began
Wait for me there, Universe Man

Richard Machin
Louisville, Ky.

The Significance of the Millennium

Lee Loevinger's article "The Significance of the Millennium" (January/February 1997) obviously struck a nerve with readers. Nearly three-fourths of all the mail received in response to that issue were about this single article!

Many of the letters were long and detailed. Many readers also wrote directly to the author (mostly favorably), who reports that his millennium article has resulted in more responses than any other article of his he can recollect. He prepared a variety of responses for the different correspondents. We could fill an entire issue with all this mail. Instead, I have selected three representative letters to publish—and from the author's various responses, I have put together one that addresses, in highly condensed form, the issues most readers seemed to be interested in or concerned about.

—The Editor

The Significance of the Millennium

I enjoyed Lee Loevinger's article. The complex and confusing matter of lengths of day and year, and noncommensurable values is exemplified by the fact that even he got it wrong. The mean solar day is not 24 hours and 4 minutes long (in round numbers) as he states, but 24 hours exactly. We, in fact, define (or once did) the hour, minute, and second in terms of fractions of a solar day. The *sidereal day*, that is, the time it takes Earth to rotate once in inertial reference, is 4 minutes *shorter*, or 23 hours and 56 minutes (again in round numbers), so that there are about 366.25 sidereal days in a year and one less solar day, or 365.25. This "one less" is because the sun appears to circulate around the ecliptic once in a year, so the sun rises and sets from a given location once less than a "stationary" star does in a year.

Things get even more complicated as we add decimal places, including things like *ephemeris time* versus *Universal time*, and *leap seconds*, which must be tucked into our atomic time reckoning roughly annually. This growing divergence between ephemeris and Universal time is due essentially to the slowing down of Earth from tidal friction, as mentioned in the same paragraph of Loevinger's article; and it is interesting to note that this quadratically growing error in the calendar (now of order 1 minute) will accumulate to a day on the same time scale as the Gregorian calendar will diverge one day from the precise year.

I don't buy Loevinger's remarks about the "pedantic argument" of 2000 versus 2001. By the definitions and conventions in force, the "new millennium" is unarguably January 1, 2001. But he is dead right in pointing out—2000 years from what? The zero point of the calendar is arbitrarily chosen by a larger amount than one year, so the whole thing is silly. It's like "celebrating" when your car odometer turns 100,001 miles, just because it already read one mile when you drove it off the dealer's lot, or to make a better analogy with the Gregorian calendar, 42.381 miles as you drove it off the used car lot. People like zeros, so let's all have a blast on January 1, 2000. After all, we can do it all over again on January 1, 2001, too.

Alan Harris
Jet Propulsion Laboratory
Pasadena, Calif.

I don't agree with what Lee Loevinger writes in the box accompanying his article.

Our Christian calendar begins with a year numbered 1. It is true that in the year 1 the Christian era did not yet exist, for this era was not devised until several centuries later. But this doesn't preclude that what we now call A.D. 1 should be considered as the first year of our present calendar. It just is a definition *a posteriori*.

Historically there was no year zero (though modern astronomers do indeed recognize a year zero). The inventors of the Christian era did not even know the notion of zero, which only later was brought from India by the Arabs.

Because A.D. 1 was the first year of the first century, and because a century has exactly one hundred years, the last year of that century was A.D. 100. Hence, the second century did not begin before January 1 of A.D. 101. Similarly, the twenty-first century will begin on January 1 of A.D. 2001. It's as simple as that, and the above considerations are quite evident, not "pedantic" at all. And the fact that the Gregorian calendar reform (which did not alter the numbering of the years) did not take place until A.D. 1582 is completely irrelevant.

If most people will celebrate the beginning of the third millennium at the start of the year 2000, this is not because of logical considerations, but just because those people are impressed by the fact that the first digit of the year number suddenly changes from 1 to 2.

Jean Meeus
Erps-Kwerps, Belgium

The article "The Significance of the Millennium" contains several errors in astronomy. Loevinger states that we have "established the lunar month as consisting of 29.53059 days, the tropical or solar year as 365.242199 mean solar days, and each mean solar day as 24 hours, 3 minutes, and 56.55 seconds, calculated as the average time it takes the sun's ecliptic (or apparent path) to cross the meridian (or celestial equator) twice."

First, a mean solar day is 24 hours and no more. This is the average day according to the sun. A sidereal day is the period of revolution of Earth relative to the fixed stars. It is shorter than a mean solar day by 3 minutes and 56 seconds.

Second, the ecliptic is the apparent path of the sun. It is redundant to say "the sun's ecliptic." One could say "the ecliptic (the apparent annual path of the sun)."

Third, the meridian and the celestial equator are not the same thing. Hence the expression "or celestial equator" in parentheses is not appropriate.

And fourth, relative to Earth, the observer's meridian is a fixed great semicircle projected onto the celestial sphere, and the ecliptic is a great circle moving with the celestial sphere. The crossing of these two circles is a non-stop process. What the

author is trying to say is that the mean solar day is the average time from one crossing of the observer's meridian by the *sun* to the next.

Norman I. Cowan
Woodview, Ontario, Canada

Lee Loevinger responds:

There are two errors of diction in the article, which are inadvertent and do not affect the argument. The year 1000 was, of course, the beginning of the eleventh (not the tenth) century; and it is inapt and inept to identify a meridian with the celestial equator. These lapses must have been due to carelessness induced by the effort of coping with the intricacies of celestial coordinate systems. (See McGraw-Hill Concise Encyclopedia of Science and Technology, *McGraw-Hill, 2d ed., 1989, p. 170;* Harper Encyclopedia of Science, *Harper & Row, revised ed., 1967, p. 215). I can only apologize for both errors.*

Determining the end of the second millennium is an issue of appropriateness, not correctness. The arithmetic of the letter writers who insist that the millennium does not end until December 31, 2000, is not wrong. But it is the gist of my argument that such matters are not determined strictly by arithmetic. Popular opinion cannot establish the precise time of Earth's revolution on its axis or transit through its orbit, but it can establish the designation we give to a day, a month, or a year.

The numbers ascribed to years are not cardinal numbers but ordinal numbers. A more simple way of saying this is that the number is the name of a year, not a quantative measure. Those who wish to do so are certainly entitled to regard the year 2000 as the year of the Dragon, like the Chinese, or as the penultimate year of the millennium. But it is more consistent with our practice in naming decades and centuries to regard the zero years as the beginning of such periods; and the same approach dictates that we regard the next millennium as beginning with the year 2000.

As early as December 29, 1995, the New York Times *considered the "millennial countdown." It reported, "In 1900, bean counters insisted that the 20th century could not begin until 1901." However, the editors declared that "[t]he millennium, when it comes, will belong to everybody. Innocent of concerns over biblical dating, people will come together in the spirit of Edward Woodyard, who made a Dec. 31, 1999, hotel reservation for the Times Square Marriott in 1983, two years before the hotel was actually built. 'I want to see those zeroes turn over,' he explained."*

Several correspondents have objected to the statement, "Modern scientific astronomy and instrumentation have established . . . the tropical or solar year as 365.242199 mean solar days, and each mean solar day as 24 hours, 3 minutes, and 56.55 seconds . . . ," claiming that the mean solar day is exactly 24 hours. While that definition does appear in various references, the Encyclopedia Britannica *(15th ed., 1993, p. 418) explains the matter more precisely in these terms: "The interval between two passages of the Sun across the meridian is a solar day. In practice, since the rate of the Sun's motion varies with the season, use is made of a fictitious Sun that always moves across the sky at an even rate. This period of constant length, far more convenient for civil purposes, is the mean solar day, which has a duration in sidereal time of 24 hours 3 minutes 56.55 seconds. . . . The mean solar day is the period used in calendar computation."*

'The X-Files' Is Fiction

Most of the time I read SKEPTICAL INQUIRER hoping to see more exposure of bogus and ill claims that allegedly exist in the *real world*. However, reading the January/February issue, I found that some of the members of CSICOP may have gone just plain idiotic by expanding their criticisms to *fiction*.

Based on the article "*The X-Files* Meets the Skeptics," it would appear that the attendees of CSICOP's Twentieth Anniversary Conference have absolutely no idea what the words "fiction" or "artistic endeavor" mean. Nor does it seem that they have any room for the concept of "imagination." Many of the questions (at least those that made it to print) were addressed to Mr. Carter as if he was willingly and knowingly presenting his fictitious drama as reality. But Mr. Carter has never done so. Why did you bother to spend any time at all on this? If this silliness continues, I fear that I will open up the next issue of SKEPTICAL INQUIRER and find an attack on all parents who promote the ideas of Santa Claus and the Easter Bunny to their children. I felt completely sorry for Mr. Carter after I finished reading that article. I would bet that he is the only person in history, except for maybe Orson Welles, who has ever been persecuted for such nonsensical reasons. Please stick to your regularly scheduled program.

Eric Wojciechowski
Sterling Heights, Mich.

Why is your magazine so obsessed with *The X-Files*? I'm beginning to wonder which is worse: gullible, uneducated viewers who think the show is a documentary, or skeptics who can't accept the fact that a bit of fantasy is okay.

Would *SI* have railed against *The Twilight Zone* and *The Outer Limits*? They also used common fantasies, urban legends, and fears of the day to tell a good scary story. Maybe *The X-Files* is done with more skill and a wink towards those gullible enough to believe, but I don't see that as any reason to harp on the show as the ultimate threat to science and reality. Producer Chris Carter has made it clear that he does not intend the show to be factual—it's a fictional show based on nearly every silly paranoid fantasy in our society. Carter may not be as skeptical as CSICOP members, but he also is not actively trying to convince us to ignore reality. And I thought Carter's point was excellent in regard to Scully's attempt to disprove all the supernatural goings-on. It's boring if she always finds the man behind the curtain.

I enjoy *The X-Files* and I don't believe a word of it. So what if others do? That just means the woefully undereducated public is the problem, not the show.

But of course, a magazine cover highlighting the need to better educate people isn't nearly as sexy as one showing Mulder and Scully. Maybe that's the problem. *SI* is just jumping on the *X-Files* bandwagon like everyone else, regardless of whether there is a real issue to discuss.

Greg Freeman
Atlanta, Ga.

Editor Kendrick Frazier responds:

I think some of our readers are going to have to get over assuming that just because we present a feature about a highly popular television program that we are obsessed with it and attacking it. I thought it was clear that

apparently most of those in attendance at the Chris Carter appearance were fans of The X-Files. *I think the interest in the show—clearly superbly entertaining fiction—can be a vehicle for raising interesting questions and issues, some of them perhaps important. And I don't think anyone need feel sorry for Chris Carter. (For a view in contrast to the above letters, see the following letter.)*

In his talk to the CSICOP conference, Chris Carter seems to be trying to defend his show *The X-Files* and its plots by saying, "Come on guys, it's only fiction, and everybody knows it." The trouble is that everybody doesn't know it. In fact a huge percentage of the viewing audience has difficulty in distinguishing fact from fiction, and the TV companies aren't exactly bending over backwards to help.

On a series recently aired on the BBC, an apparently serious attempt was made to look into future scientific discoveries. The show was a curate's egg of genuine research and wild speculation, but what really dismayed me was that it was fronted, not by a scientist, but by Gillian Anderson, the actress who plays Agent Scully. Just what was the message being purveyed here? Who were we supposed to be seeing, an actress with, as far as I know, no scientific training worth speaking of, or Agent Scully herself, scientist and investigator?

As long as the TV networks insist on trying to pretend that actors and actresses who play dramatic roles depicting professional people actually have some wisdom to impart to the general public about those professions, then the more gullible amongst the viewing public will continue to take what they see in the fictional shows at face value. Sorry, Mr. Carter, you may have impressed the CSICOP audience with your claims to a skeptical outlook and your political correctness, but I shall continue to see your rather silly program as yet another propaganda machine for the propounders of New Age claptrap.

Mike Walsh
Kettering, Northants
U.K.

Quantum Quackery

Victor J. Stenger's "Quantum Quackery" (January/February 1997) raises some issues I would like the readers of *SI* to address, if possible. The first is the status of "nonlocality" with respect to current experimental evidence. The second is more an observation that most writers in *SI* tend to adopt what I call *naive corporealism* as the only scientifically credible metaphysic for quantum mechanics.

The Alain Aspect experiments of 1981, as I understand them, were designed for nonlocality by timing and spacing measurements such that there could be no subluminal or local interaction. Such an interaction would have required velocities greater than the speed of light. Yet, an interaction between quantum events was observed. This result means either that our understanding of quantum mechanics—and possibly relativity—is incomplete, or an act of experimental measurement involves a nonlocal or superluminal component.

Unfortunately, many New Agers and assorted spiritualists have seized on this outcome to justify the quackery that *SI* thankfully discredits as having no basis in controlled experiments. I will call this *naive non-corporealism.* Alfred North Whitehead in *Process and Reality* (1929) has called the tendency of scientists to naive corporealism "the fallacy of misplaced concreteness."

The universe may, in fact, be an organic relation not reducible solely to the sum of its parts. Still our knowledge of it must be disciplined by rigorous experiment. To recognize that the totality of human knowledge includes the emotive experience of a symphony, as well as the intellectual knowledge of the physics involved, in no way diminishes our need for the methodology of science.

I would like someone to set the record straight on the Aspect experiments. Is my interpretation of them correct, or is the interpretation in dispute? It seems to me that as long as my interpretation is possible, Whitehead's work in *Process and Reality* is one major landmark that deserves another look.

Donald B. Brady
Mississippi Philosophical Association
Jackson, Miss.

Victor Stenger responds:

The Aspect experiments and their interpretation were discussed by me in a long article, "The Spooks of Quantum Mechanics," that appeared in SI, *Fall 1990. They form the major theme of my recent book,* The Unconscious Quantum: Metaphysics in Modern Physics and Cosmology *(Prometheus Books, 1995). So here I will just try to clarify some of the points raised by Brady.*

By "nonlocality" Brady seems to mean superluminal signaling, which is the same definition I use but is not always so specific in most of the literature. Nonlocality, so defined, has not been demonstrated by the Aspect results. Superluminal signaling is not implied by this experiment, has never been seen in any experiment, and has been proven to be impossible in any theory consistent with the axioms of relativistic quantum mechanics. The Aspect results are exactly as predicted by conventional quantum mechanics.

What does appear to be required by both quantum mechanics and the Aspect experiments is something different: inseparability. *In this class of experiments, measurements are made on two particles that emerge from the same specially prepared source and then separate from one another. The results of an observation at one place in space are found to depend on the results of an observation at another, separated place, in a way that cannot be explained by familiar, "commonsense" ideas. This does not imply, however, that some* act *performed by an observer at one place causally affects the results found at the other place. Neither observer has any control over the experimental results, and it can be demonstrated that nothing the observer does at one place can be used to transmit information superluminally to the other place. Thus, there is no superluminal signaling and no nonlocality.*

The implied inseparability results from the fact that, in experiments of this type, the particles observed at both places originate from the same source and so are correlated with one another. This correlation, which is greater than expected from classical ideas, is carried along by the particles as they separate. All that these experiments, and a whole series of others we continue to read about, show is that some of our descriptions of the properties of particles that are based on classical ideas are wrong. But we have known that for almost a century. How much confirmation does quantum mechanics need? Don't get excited until an experiment comes along that actually conflicts with relativity or quantum mechanics.

I may be naive, but I am not sure that I am "corporeally" so. This is a nice term Brady

seems to have invented. If by "corporealism" he means the view that matter is real, or more specifically, that particles such as photons and electrons are real, then I accept the designation.

Quantum mechanics confirmed the pre-Socratic notion that the universe is reducible to the sum of its parts. After a century of quantum mechanics, everything still remains the sum of its parts. (Technical note: In quantum mechanics we add the probability amplitudes of the parts rather than the probabilities themselves, but we still sum up the parts.) Relativity showed that some of the parts of the universe must forever remain independent of others, namely, those outside their common light cone. Continuity and wholeness were destroyed by twentieth-century physics, not resurrected. "Quantum" means "discrete," not "continuous."

As for any connection with the philosophy of Alfred North Whitehead, I am told he was well-acquainted with quantum mechanics and was certainly no quantum mystic or holist. In fact, in Process and Reality *he says: "Thus, the ultimate metaphysical truth is atomism."*

Kudos to Victor Stenger for presenting a strong rebuttal to those physicists and mystics who go far beyond the bounds of warranted interpretation of quantum mechanics (QM) to assert that thoughts create reality or claim that QM demonstrates the existence of a universal cosmic mind. Such interpretations of QM stem from its nonlocal nature. Nonlocality is an experimentally proved fact, not just of QM, but of nature itself. This is because if nature were local, it would necessarily have to obey certain correlation inequalities for certain pairs of spacelike separated events. It has been shown experimentally that these inequalities are in fact violated in nature. These inequalities can be established based on only the single basic assumption that nature is local. Consequently, their violation necessarily implies a nonlocal nature.

The experimental results agree with the predictions of QM, which puts another feather in QM's cap; but more importantly, they demonstrate that *any* theory of fundamental particles must of necessity be nonlocal in nature. These results are physical macroscopic phenomena, in effect, readings of meters registering 0s or 1s. They are not some fictitious mathematical functional behavior, not an illusion, but real-world phenomena.

This nonlocality of nature is not understood at present; it is a mystery but not a metaphysical or mystical one—it just *is*, like gravity or space-time curvature just *are* observed properties of nature. This requires no superluminal communication or transmission of effects for its manifestation—this would be required only if nature were local. Nature seems to have its own built-in nonlocality.

But this nonlocality is manifest for only certain special kinds of "entangled" pairs of events (electron-spin measurements). After measurement, the two events are thereafter unrelated in any way—the two electrons go their independent merry ways. It is scientifically unwarranted to extrapolate this property beyond the context in which it has been established.

Dr. Stenger is to be strongly commended for his long-time and untiring efforts in his books and articles to dispel the fallacious metaphysical and mystical self-serving interpretations of quantum mechanics.

R. H. Davis
Palo Alto, Calif.

The Mysterious Placebo

I was delighted to read John Dodes's article "The Mysterious Placebo" (January/February 1997). Dodes deserves praise for calling attention to the ubiquitous and powerful nature of this influence in all of the healing arts, particularly in the field of pharmacology.

Anyone browsing through the *Physician's Desk Reference* for 1996 or any previous year will be startled to discover just how effective a placebo is compared with the drug being tested during clinical trials. Moreover, the broad and significant effects of suggestion *per se* can come from everything from the physician's bedside manner to framed diplomas on the wall behind his or her desk, the powers of so-called hypnosis, the laying on of hands or the placing of needles, expressions of caring or knowing that someone is praying over you, or the taking of any medication in any shape or form.

Several years ago, a colleague and I found that the use of fake health machines indicating that mental patients were feeling better and were getting physiologically healthier had significant positive effects on patients' emotional states; in other words, depressed patients felt better and were more optimistic. Telling them they were not depressed and reinforcing the telling with the machine's false records was more effective than the mood-elevator medications.

Readers interested in learning more about the power of placebos and the placebo effect should consult two recent and excellent surveys: *Placebo: Theory, Research, and Mechanisms*, edited by Leonard White, Bernard Tursky, and Gary Schwartz (Guilford Press, Division of Guilford Publications, New York, 1985); and *Placebo Effects in Health and Disease: Index of New Information with Authors, Subjects, and References*, by Joseph J. Hartwick (ABBE Publications Association, Washington, D.C., 1996).

Robert A. Baker
Lexington, Ky.

Keeping Score on Predictions

It was entertaining to read Gene Emery's comments on failed tabloid predictions (News and Comment, January/February 1997), especially the one about Jerry Lewis and Dean Martin reuniting on TV, printed very near the time of Martin's death. . . .

Perhaps you should also keep score on another group of speculative prognosticators—stock pickers. Self-promoting "analysts" are forever turning up on TV (CNBC seems infested by them), touting their predictions, and trying to justify them with pseudoscientific formulae and strange signs and portents. Most are as vague and hard to pin down as the daily horoscope, though. "We definitely feel this particular stock will show strength, in the near to long term, and at least hold its own, unless weaknesses develop into an inevitable decline."

By the way, how is Madonna supposed to win a Senate seat in 1997, a nonelection year? It would be a heck of a story if this prediction were to come true.

Ted C. Lambert
Novi, Mich.

The Pope's Neo-Darwinism

In your comment on the pope's alleged acceptance of evolution theories (*SI*, January/February 1997) you seem to praise his attempt to "bring the church into accord with science." Indeed, this view hit the headlines of most American and European newspapers following John Paul II's talk at the Pontifical Academy of Science last October. I wonder if you had a chance to skim through the unabridged version of the pope's text, and how many commentators did so.

As you pointed out, John Paul II's promoting evolution from "a serious hypothesis" to "more than an hypothesis" did little more than underpin what the Catholic Church already accepted almost fifty years earlier (Pius XII's "Humani Generis," 1950). On the other hand, he took the opportunity to assail the scientific effort to apply evolution theories in the investigation of human behavior, brain development, consciousness and free will, moral and aesthetic sense.

At the end of the "decade of the brain," science is on the verge of uncovering new fascinating avenues that might allow us to understand a bit more about ourselves. What does the pope say? He says this is a matter of theological contention only, and that any materialistic and scientific approach to human nature is against the dignity of human beings. To "rehabilitate" Galileo, and partly Darwin, was unavoidable; the pope's speech is a dashing move to launch a new witch-hunt in this coming middle age, while we applaud.

Sergio Della Sala
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PSYCHIC VIBRATIONS

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tributed a chapter to the book *The Geller Papers* (edited by Charles Panati), describing the wondrous properties of Uri Geller's Kirlian aura. The magician David Alexander relates how Moss demonstrated the way a box allegedly filled with orgone energy (a "discovery" of Wilhelm Reich's) would deflect a compass needle, unfortunately neglecting to repeat the experiment using a different box having the same amount of metal, only without the orgone energy.

* * *

If anyone is in a good position to finally provide answers to long-standing "paranormal mysteries," it is Las Vegas–based millionaire Robert Bigelow. Real-estate magnate and heir to a fortune from the well-known tea company, he has provided substantial funding to found a National Institute for Discovery Science in Las Vegas (http://www.accessnv.com/nids), just down the road from MGM's Emerald City of Oz. Bigelow also played a major role in funding the 1992 Abduction Study Conference at MIT and the Roper Poll, which asked about supposedly abduction-related phenomena and is now notorious for its unreliability.

Recently, Bigelow has attempted to hire first-rate scientific talent to apply the disciplines and techniques of mainstream science to unravel the mysteries of the Beyond. His organization's ad in *Science* magazine (March 1, 1996) attempts to recruit scientists who are "capable of employing accepted scientific methods to novel or unconventional observations or theories, while maintaining the highest ethical and quality standards." However, his group has not, as yet, made any discoveries concerning the "paranormal" that were considered worthy of publication in mainstream scientific journals. The *Las Vegas Sun* reported last October 23 (archives on-line at http://www.lasvegassun.com) that when Bigelow heard about a supposedly "haunted ranch" near Fort Duchesne, Utah, he negotiated to purchase the ranch for approximately $200,000 so it could be properly investigated by his Institute. Not only have many UFOs reportedly been seen on this ranch, but cows are mysteriously mutilated, crop circles appear, and lights emerge from circular dimensional "doorways" that hover in midair. The seller of the ranch, Terry Sherman, claims to have received higher offers from other buyers but turned them down to avoid placing others at risk. Meanwhile, heedless of dangers to his own safety, Sherman has remained as caretaker of the ranch, an employee of Bigelow. We eagerly await the publication in scientific journals of the National Institute for Discovery Science's papers documenting and explaining the remarkable happenings on its new property.

Another individual who seems to have inherited more money than talent for critical thinking is multimillionaire Laurence Rockefeller, who has been donating substantial sums to various UFO research groups. Recently Rockefeller financed the publication of a book titled *UFO's—The Best Available Evidence,* which was given to approximately one thousand political leaders and other decision makers in the U.S. and around the world. The Bigelow people sneered at that book, noting that much of it was a re-hash by editor Richard H. Hall of his book *The UFO Evidence,* published by the National Investigations Committee on Aerial Phenomena (NICAP) in 1964, at that time the largest UFO group. The New York *Daily News* noted (August 24, 1995) that Rockefeller has been lobbying the Clinton administration to open up supposed UFO secrets that he believes are buried in government vaults. The newspaper reports rumors that the eighty-five-year-old Rockefeller hopes that advanced alien technology will contain secrets of longevity. Asked about such rumors, Rockefeller spokesman Frasier Sietel replied, "I don't know about any anti-aging cure. But Laurence's interests are broad. He's a real eclectic fellow." □

Robert Sheaffer's World Wide Web page for UFOs and other skeptical subjects is at http://debunker.com/~sheaffer/ufo.html.

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- Prepares bibliographies of published materials that carefully examine such claims
- Encourages research by objective and impartial inquiry in areas where it is needed
- Convenes conferences and meetings
- Publishes articles that examine claims of the paranormal
- Does not reject claims on a priori grounds, antecedent to inquiry, but examines them objectively and carefully

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